

1/39

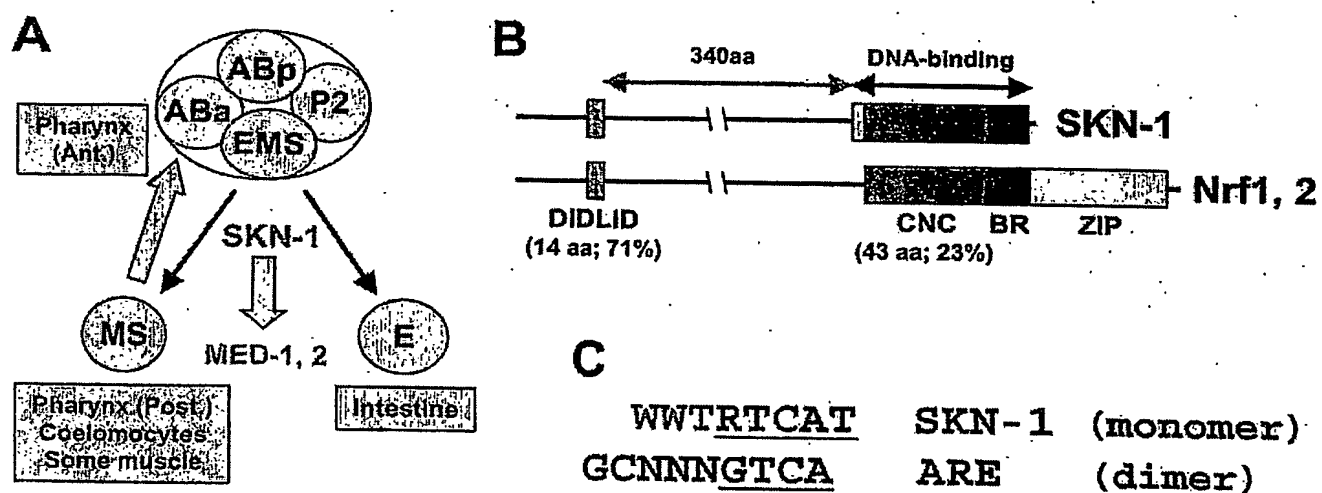


Fig. 1A-1C

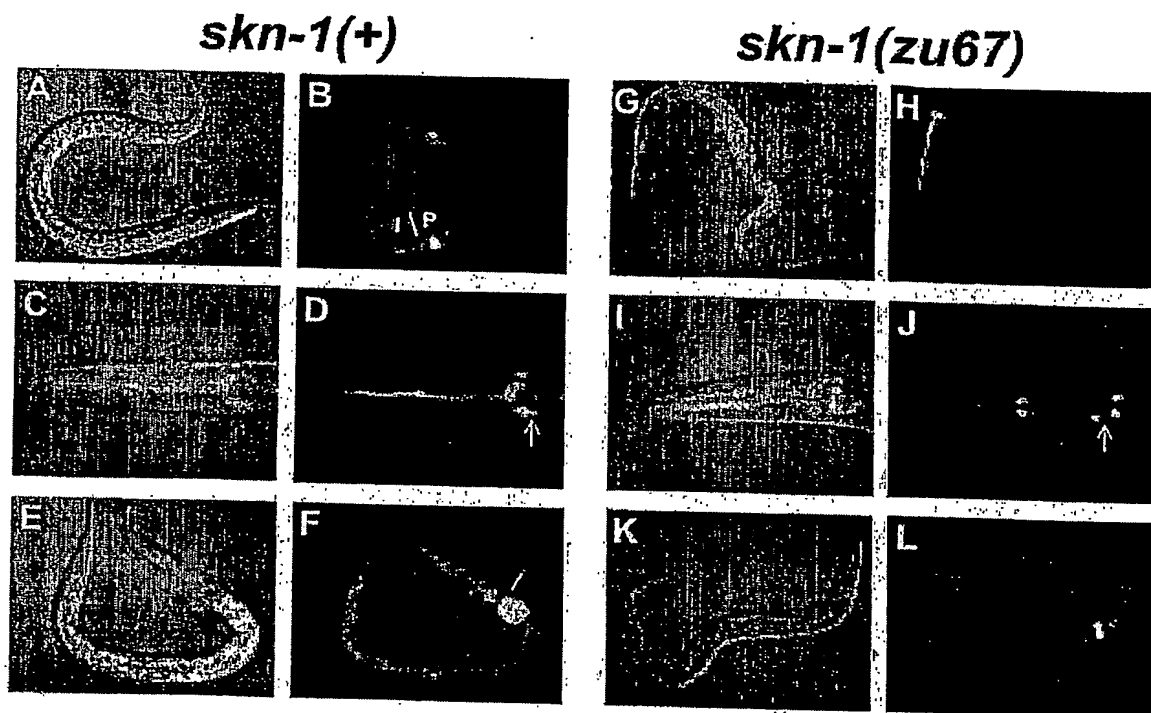
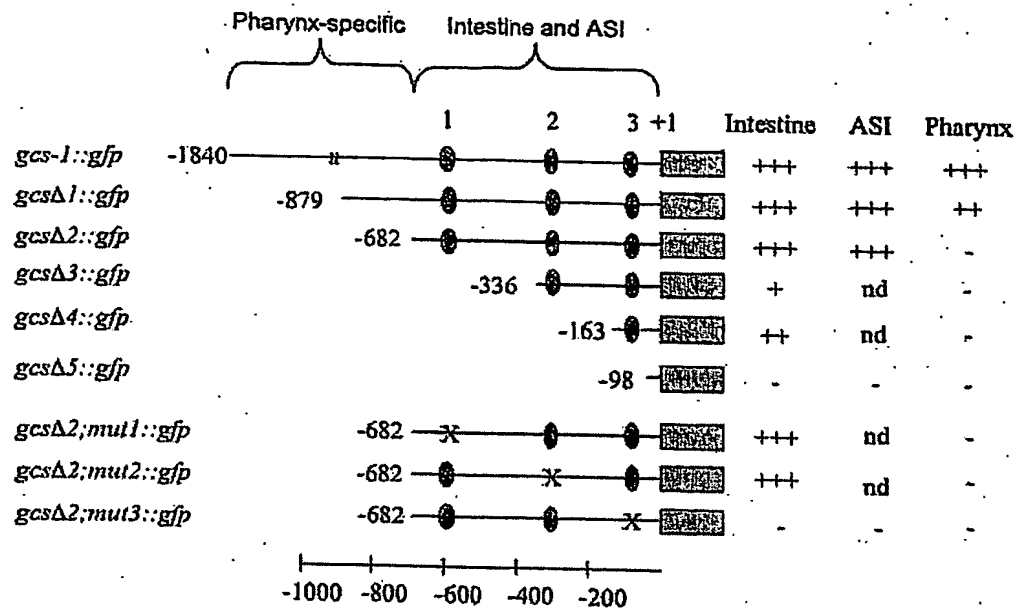
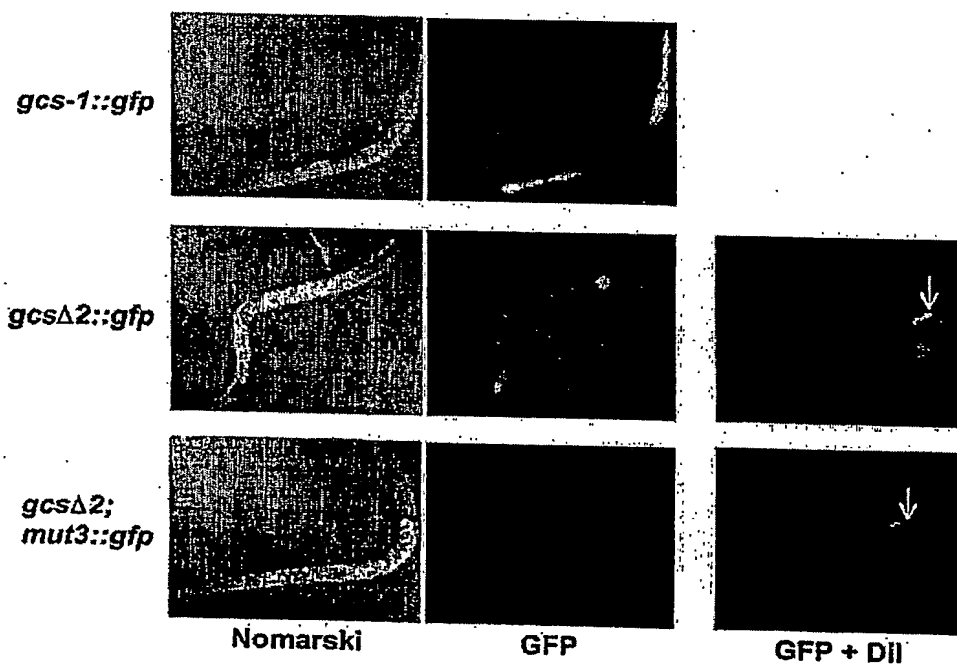


Fig. 2A-2L

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A**B****C**

<i>gcs-1</i>	-124	CA-CTTTATCATCATGA-GATTTAATGTTTCCTTTTCAT--TTTCT-83
<i>med-1</i>	-127	CACCTCTGTCATCATGATGATTTTGTGGAG-CATTATCATCATTTCT-83
<i>med-2</i>	-127	CACCTCTGTCATCATGATGATTTTGTAGAG-CATTATCATCATTTCT-83

Fig. 3A-3C

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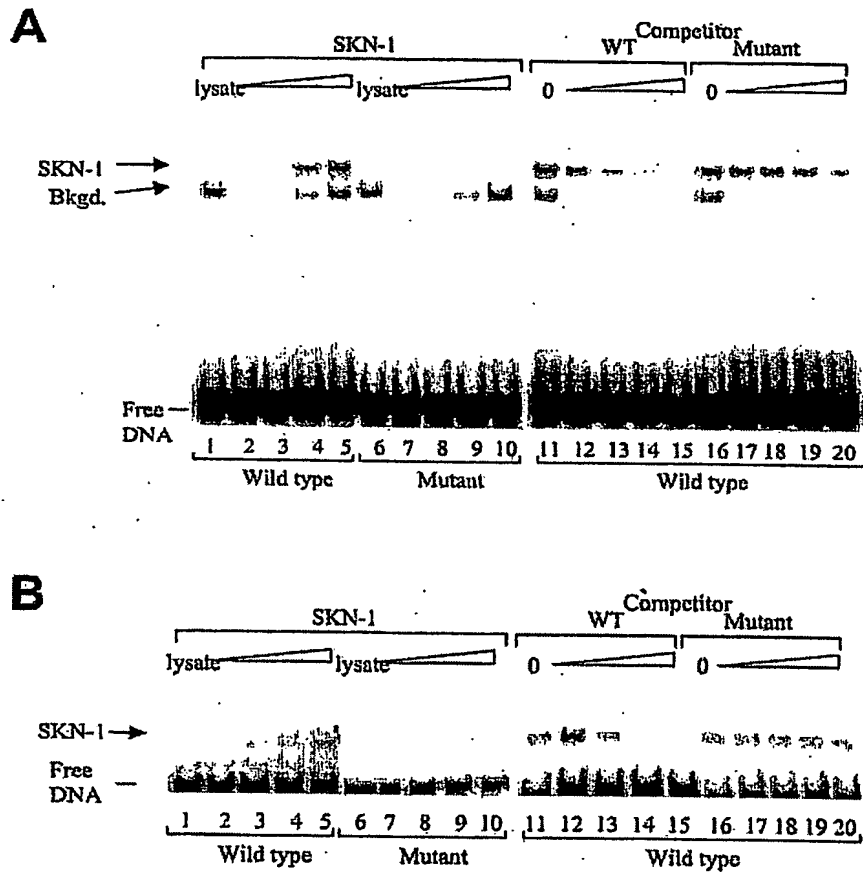


Fig. 4A-4B

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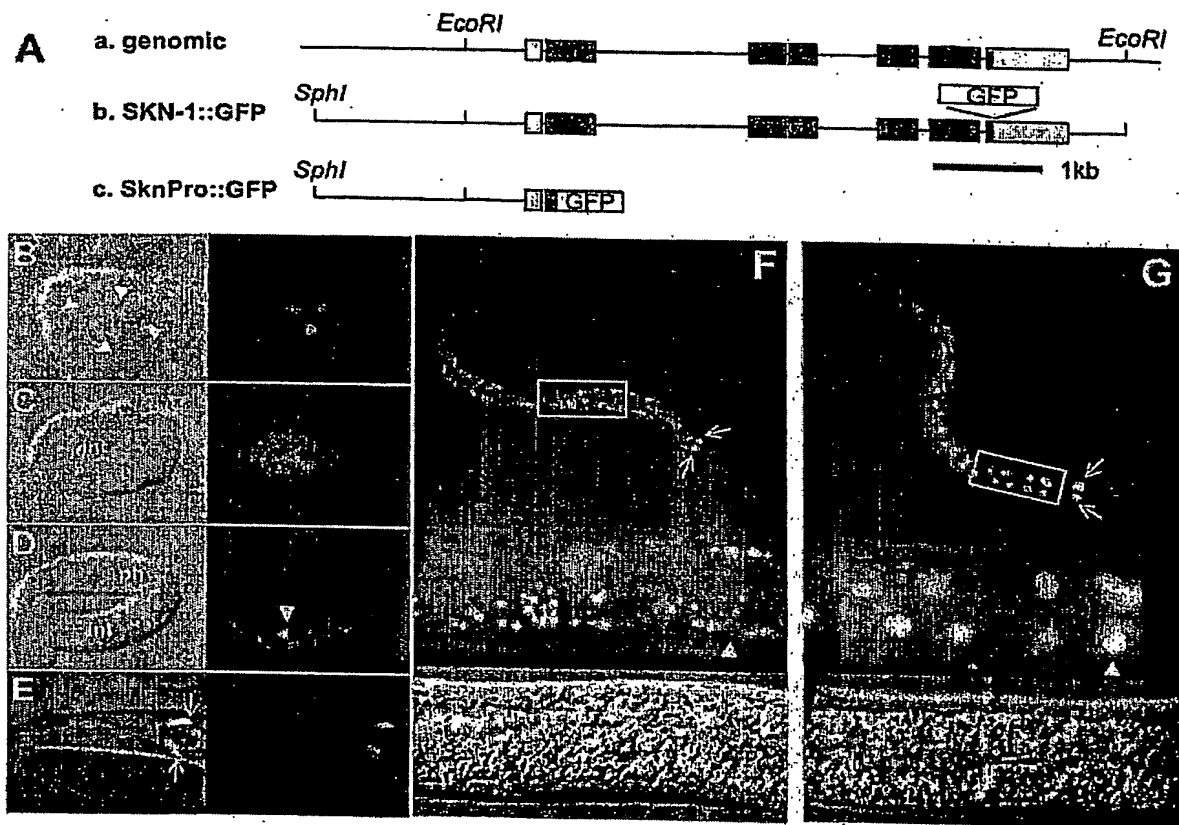


Fig. 5A-5G

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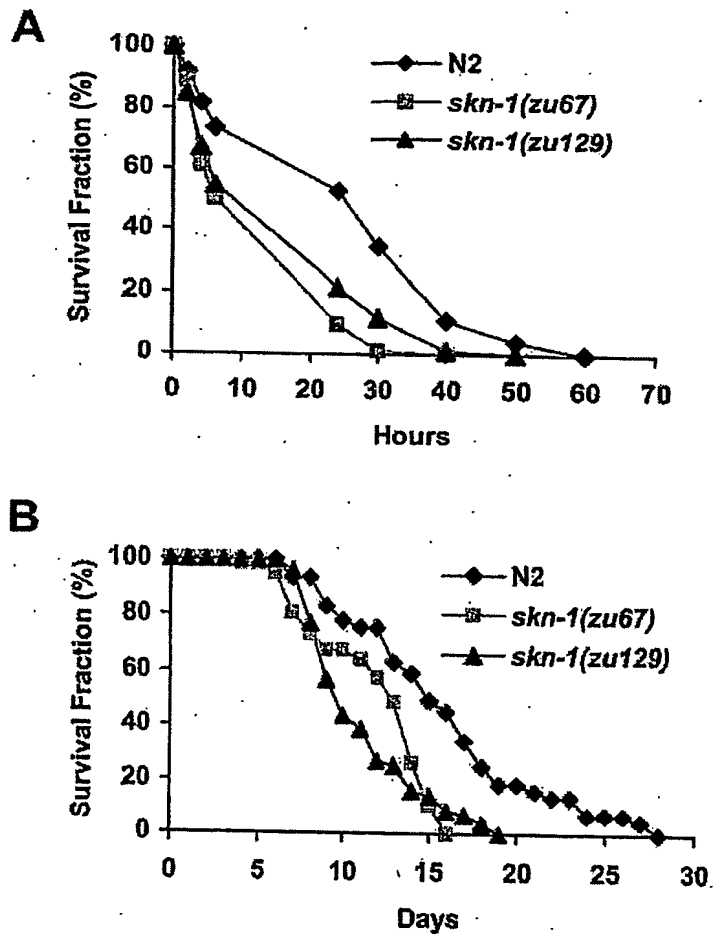
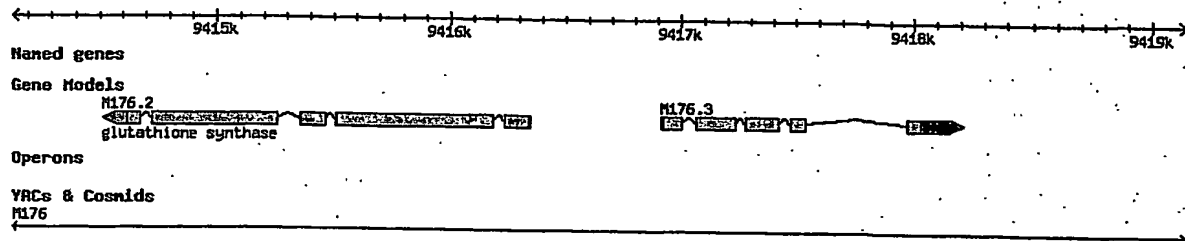


Fig. 6A-6B

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The M176.2 gene is located on chromosome II. Regulatory sequences can be found e.g., in the region between 9416340 and 9415915. An exemplary sequence of this region is as follows:

```

GACAATTATCGATTAATAAAAGTTTAAACAGACACGAGAAATTAAATATAAAAAATTGAATTGTTTATTT
GTTGTTTTGTGTGTAGAAAAATAATTTTGATAGAAACAAAAAATTAGCGTAAAAATAATAGCTAGCGCAA
TACTCGTGACGAGATGTGCGCCAGCAGCTCCTTGACGCAAACGTGACGTTTAGCACCAAAATGATTTT
                                     -378
TGCTCTTTGAGTTCTTTGTTTTCGGGAGCAAATTTTCATGCCAATCCCTTTCTTTTTTCAAATTTTCCTG
TTAAATTCATGTAATAACTATTATTCATGTCAATTACAACAAATAAGCATCCAAGATTTTATCATAAACT
                                     -243
CGTTCAAACCTCCTTTTACCACTCGAAAAGCAATATCTCCGACTTCCTTCAAAGAGAAATGATGACAAA
                                     -169
CATAGAAACCTCACGTTATACGTTTGTGTCATCACGATTTTCAGTGCTCACTTTTCTCATTTTCATTCTCGCT
                                     -137
TAATTCATTTTTGTCACTCTCGCGTCATGTTTTGCATTTTTTCGAAAGCATTATTTAAAACTGAAAAAA
TAATTCGTAATTTTTCAAGAATGGCT
  
```

FIG. 7

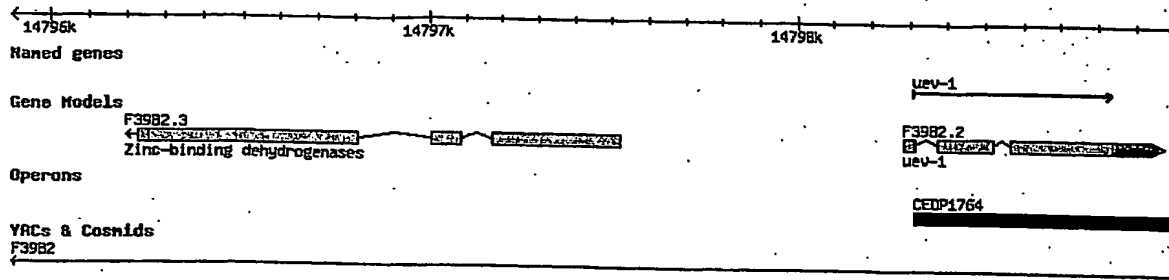
Exemplary M176.1 sequences:

Amino Acid Sequence									
MAQKDDRILL	LNAPRLPLED	DKLNELTADL	HDWAHANGLV	MRLSTDKLSS	EVCQTTPLTL	LSPFPKNVF	EEAVHIQNLF		
ASLYHFIAYE	FDFLIDIHKN	VVKTDDEFTRN	MVEILKKVKA	OGLKQPVTLA	IQRSDYMCHK	DQYSAEYGLK	QIEINNIASS		
MGAHALRLTE	WHIRVLKALN	ISDDVIQRAI	PENKPIPMIA	EALFKAWSHF	SNPAAVVLVV	VENVNQONQID	QRHVEYELEK		
LGVPMTCIIR	RNLTQCYEQL	SLNDRSDLMI	DGRQVAIVYF	RAGYSPDHYP	STKEWEARER	MELSTAIKTP	WIGLQVANTK		
KTQQVLSEDG	VLERFIGKPR	EARDIRASFA	GMWALENTDE	VTMKVVAGAQ	KHPEAFVLKP	QTEGGAALHT	GDEMVQMLRE		
LPEEERGAFT	LMEKLKPMII	ENYLVLAKKP	ITFAKAVSEL	GVYGYAFGRK	DAPELKTAGH	LLRTKPESTA	MGGVAAGHAV		
VDTPFLYEFI									

Spliced mRNA									
aaagaATGGCT	CAAAAAGATG	ACCGGATTTT	GCTGTTGAAT	GCTCCAAGGC	TCCCGCTCGA	AGATGATAAG	CTCAACGAGC		
TCACCGCTGA	TCTTCACGAT	TGGGCTCATG	CTAATGGGCT	TGTCATGCGT	CTATCAACCG	ACAAGTTGAG	CAGCGAAGTT		
TGTCAAACCTA	CTCCATTAACT	ACTTCTTCCA	TCTCCATTCC	CGAAAAATGT	TTTTGAAGAA	GCAGTTCATA	TTCAGAACCT		
TTTCGCAAGT	CTTTATCACT	TCATAGCTTA	TGAATTTGAT	TTTCTAATCG	ATATTCCATA	AAATGTCGTG	AAAACCTGATG		
ATTTACACAG	GAATATGGTT	GAGATCTTGA	AGAAAGTCAA	AGCCCAAGGA	CTCAAGCAAC	CAGTCACTCT	CGCGATTCAA		
CGATCTGATT	ATATGTGTCA	TAAGGATCAA	TATTAGCGG	AATATGGACT	GAAACAAATT	GAAATAAACA	ATATCGCCTC		
GTCAATGGGA	GCACATGCTC	TACGGCTCAC	CGAATGGCAT	ATCAGAGTTC	TTAAAGCGTT	GAACATTTCC	GATGACGTCA		
TTCAAAGAGC	AATTCCAGAA	AACAAGCCAA	TTCCAATGAT	CGCTGAAGCT	TTATTCAAGG	CCTGGTCCCA	CTTTTCGAAC		
CCAGCAGCTG	TGGTCTTGT	CGTTGTAGAA	AACGTCAATC	AAAATCAGAT	TGATCAACGC	CACGTGGAAT	ATGAACTTGA		
AAAGTTAGGA	GTACCGATGA	CATGTATTAT	TAGAAGAAAT	TTAACACAAT	GCTATGAACA	ATTATCATTG	AATGATAGAA		
GCGATTTGAT	GATTGATGGG	CGTCAAGTAG	CAATTGTTTA	CTTCAGAGCA	GGATACTCAC	CTGATCATTG	TCCATCTACA		
AAAGAATGGG	AAGCACGTGA	GCGTATGGAA	CTTTCCACCG	CTATCAAAAC	TCCATGGATC	GGGCTACAGG	TGGCAAATAC		
TAAGAAGACC	CAGCAGGTTT	TTTCTGAAGA	TGGAGTACTC	GAAAGATTCA	TCGGAAAACC	ACGAGAAGCT	CGCGATATTC		
GAGCTTCATT	CGCAGGAATG	TGGGCTTTGG	AGAACACTGA	TGAAGTGAAT	ATGAAAGTCG	TGGCTGGAGC	TCAAAAACAT		
CCAGAAGCGT	TTGTTCTGAA	GCCACAAACT	GAAGGTGGAG	CCGCATTGCA	CACCGGTGAT	GAGATGGTTC	AAATGCTCCG		
AGAACTTCCG	GAAGAAGAGC	GTGGAGCTTT	CATTTTGATG	GAGAAACTGA	AACCGATGAT	TATTGAAAAC	TACCTGGTTC		
TTGCAAAGAA	GCCGATCACA	TTTGCTAAGG	CTGTTAGTGA	ACTTGGAGTG	TATGGTTATG	CATTGGAAG	GAAGGATGCA		
CCTGAGCTTA	AGACTGCTGG	GCATTGCTC	CGAACGAAAC	CGGAATCCAC	AGCTATGGGT	GGAGTAGCCG	CCGACATGC		
TGTTGTGCGAC	ACCCCATTC	TCTACGAATT	TATTTGAttt	cgaacataat	cagaaaactc	aacaaaaatg	ctgtgatatg		
aaaccatttg	ctatttagat	ctttttgtgt	ttgtaaattt	aatcattgta	atttattgaa	tgt			

FIG. 8

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The F39B2.3 gene is located on chromosome I. Regulatory sequences can be found e.g., in the region between 14 797 521 and 14 798 310. An exemplary sequence of this region is as follows:

```

CATTTTGAAAGTGCCCAAGTTGCTGGAACGCTGAAAATTGAAATTATTAACAAAGAAATTTGCTTTAAAA
TCCGAAAAATCAAGAAAAAATCGATAATTCGTCGGACAATCCGCCTGCTAGCACGGCTTGACGCTCGTT
TGCCGCGCGCTCATTCGATTTGTGTGAGTGCCCAGTGGAGCGCGTTTGC'TAAGGCTAACTGTGTAGTCCT
CTCGACAAGATCTGTGAACATTGAAATGAAACACTTGGGTTCAATAAAATCACAAGAAAATGATGACAA
-518
TTTGTGTTGCGACCGAAAAAAATTATAAAAAATTGAATATTGGTTATCATCGTTTCAATCTTTGTTTTGT
-469
ATTAAAGGCACAGCTGCTAAAAATTGTTTTTTTTTTTCAATTTTGCTAAAAGAAAATCAATTTTCTGAT
TTTTTGTTGAGTTCCCGTGCAAATCAATGTCCTAGCTTTTAAAAATTGTTTTTTGTTATGTAATTCTAAT
CAAATTTTGTGCAATTTTCAGAGATTTTCTGCTAAAACACTAAAAATAGTCTAAAAGTCGATAATTTGAT
AAACATTTACTCAAACCTTTTACGGAAAAATGAAACAAAAGTTGCAAAAATATAGTAATTTGCAATTTT
CTGAACGCGTACTTAAAGGTACACGGTTTGATTCCGATTGGTCCCGCCACAAAGTGTACCATAACATTT
TTCTCGCTGCGAGACCCATCCGAATAAATCCGTGCGCCTAATCAGTGCGAGTACGCATTTTCATATTACTG
ATAAGTGCCATTTTTAGAACAAATG

```

FIG. 9

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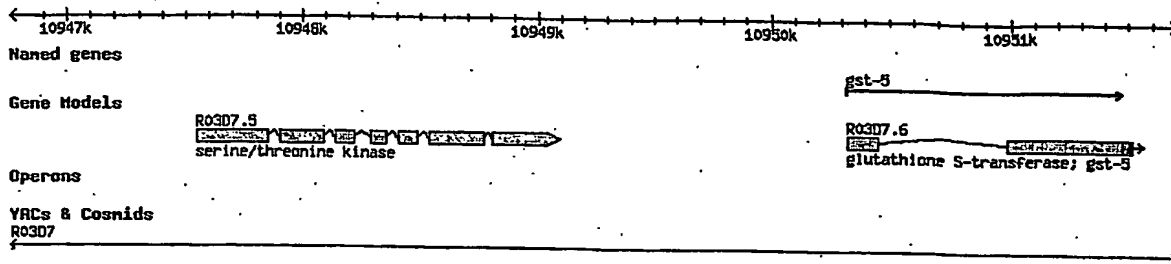
Exemplary F39B2.3 sequences:

Amino Acid Sequence									
MSKSICKSSM	RAAVVRRFGA	PDVIEAVESD	MPRLKQNVL	VRNYAAGVNP	VDTYIRAGQY	GKLPNLPYVP	GKDGAGFVEL		
VGESVKNVKV	GDRVWYGSEA	DSTAERYAVN	RPFELPEGVS	FEEGASLGVP	YLTAYRALFH	LAGAKTGDVI	LVHGASGGVG		
SALMQLAAWR	NIEAVGTAGS	ADGIRFVKSL	GARNVYNHSD	KQYVSKMKND	YPGGFNHIFE	MAAHTNLNTD	LGLLAPRGRV		
AVIGNRAETT	INARQLMVTE	GAVYGVALGM	SSEAELLDFG	INIVSFLKET	EFRLINKLY	RLEQLGLAHE	EIMNNKGAKG		
NLVVQIEH									

Spliced mRNA									
ATGAGCAAAT	CGATTGCAA	ATCAAGCATG	CGCGCAGCTG	TAGTCCGACG	ATTCCGAGCA	CCTGATGTCA	TAGAAGCCGT		
CGAGAGTGAT	ATGCCCAGGC	TTGAAAAAAA	CCAGGTTCTC	GTTCCGAATT	ACGCTGCCGG	TGTCAATCCA	GTTGACACAT		
ATATTCGTGC	TGGTCAGTAT	GGAAAACTAC	CAAATCTTCC	ATATGTACCA	GGAAAAGATG	GAGCCGGATT	CGTCGAACCT		
GTGGGAGAAA	GCGTTAAAAA	TGTGAAAGTC	GGCGATCGAG	TCTGGTATGG	ATCAGAAGCG	GACAGTACAG	CAGAGTATGT		
TGCGGTGAAT	CGACCATTCG	AGTTGCCGGA	AGGAGTTTCG	TTTGAGGAAG	GAGCTTCTCT	CGGAGTGCCT	TATCTTACCG		
CTTATCGTGC	ATTGTTTCAT	CTTGCTGGTG	CAAAGACTGG	CGACGTTATA	CTTGTACACG	GAGCATCTGG	TGGAGTGGGA		
AGTGCACTGA	TGCAGCTGGC	TGCCTGGAGG	AACATTGAAG	CTGTTGGCAC	TGCTGGATCT	GCTGATGGGA	TCCGGTTCGT		
GAAGAGTCTT	GGTGACCGGA	ATGTCTATAA	TCATTCCGAT	AAGCAATATG	TGTCGAAAAT	GAAAAATGAT	TATCCAGGAG		
GCTTCAACCA	CATTTTCGAA	ATGGCTGCTC	ACACAAATCT	GAACACGGAC	CTCGGATTGC	TGGCTCCACG	TGGTAGAGTT		
GCAGTAATTG	GAAATCGCGC	CGAGACCACG	ATCAACGCAA	GACAACCTAT	GGTTACAGAA	GGAGCTGTTT	ACGGTGTAGC		
ATTGGGAATG	TCTTCCGAGG	CTGAGCTCTT	GGACTTTGGC	ATCAACATTG	TCTCATTCTT	GAAGGAAACC	GAGTTTCGTC		
CACTTATAAA	CAAATGTGAT	CGTCTCGAGC	AATTAGGACT	GGCTCATGAG	GAAATTATGA	ACAACAAGGG	ACGGAAGGA		
AATCTTGTAG	TGCAAATCGA	ACATTAAAttc	attatttttaa	cacgccattt	aaaggaa				

FIG. 10

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The R03D7.6 gene is located on chromosome II. Regulatory sequences can be found e.g., in the region between 10949088 and 10950317. An exemplary sequence of this region is as follows :

AGAACTTTTCGAGAAGTCTACCGTTGTAGTTTTTCGAAATAGTAATTTATTTAGTGACGTTTATAAAGGTTTACATGATTT
GGTTTGGAATTTTTTAGGAGTTTATTCATAAAAAACAAAGTAACCATGGACATTCCAGAAGTCTATAGTACACGCGATCC
TACCGTACCCCTTCAGTATTTCTATCAGATTGATAGCTTTCGGTAGTCAGGTACAGCCTAAAAAATTCCTGCTTGCCTTTT
TGCCTACATGTCTGCCTACCTTCAGTCATAATGCCTACATAATG

-947

ATTTTTTCCAATTGAACTTGCAGACAGAAATTCAAATGGCAAAAAGAAACAAACACCGAAACATTAATCA

CATTTCTTTTCATATCAGTTTTCTGTCAAAGCACATTTCTGGAGTCTGTGTGTATTTTTTGTGTCTTTATGTGATCGG
TGTGTGAAATTTGTAGTTGATGTTGATAACATACTTTTTTTTGAAACAAAAAGTGATTGATTAGGCTTGAATTCAGAGA
TATGTTTCGTGATACTTTGCGATTCTCGAGCCAAAAACACGGTATCCGGTCTCGACACGACAACTTTTTCGCAAAATACAA
GCTGATGTGCGCCTTGAAAGAGTACTGTAATTTCAACCTTTCGTTGTTGCGGAATTTTCATAGTTTCTCGTTCAAAATAT
ATGTATTTATTAAACAAAAAACTAAACAAAAACAATTGAGAACACATAAAATGTGAAAAATCAATGAGACCACAGCAAAA
AATTTTGTATCTACAGTACTCTTTAAAGGCGCACATCCGTTCTTATTTTCAGCAAAAATGTCGCTTCGAGACCGGGTACC
GTATTTTTTTTTTGTGCAAACTTTAGGTCTAGGTAATATTAATAAAAAAATTCACAAAACCTAGAATCTAGAGCTTTCCAT
TAAATTTTTTTGATGACATTTGAAAATTCATGATGATTTTTTCCAACAATTCGAAATATCCCTCTTTTCACCTGGTCC

-302

-282

ACTGAATTCTCTTTCCGAAAGACCACCACAATTTCAAGGCTCCGCCCATTTTCGTGGTTTGTAGCCTTCCCGACCCTACGT
TTTTGATGACAATTTGTGAGAGAAGTGAGAGGTTTCAGACACAAAAAGCGACGTGGTCTGAATGA

-149

GTATAAATAGAGAGTGAAGTTTCCAATTTCCCTCACAATTGTTGTTTGAATCCACTTTCCAAAAAACACAACCTTCAA
TCAAAAATCATTATGGTT

FIG. 11

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Exemplary R03D7.6 (gst-5) sequences:

Amino Acid Sequence

```

MVS YKLT YFN GRG AGEV SRQ IFAY AGQ QYE DNR VTQEQ WP ALK ETCA APF GQL PFLEV DG KKLA QSHA IA RFL AREFK LN
GKT AWEEA QV NSL ADQY KYD SSEAR PYFYA VMGF GPGD VE TLKK DIFLEA FEK FYGFL VN FLK ASGSG FL VGD SLTWID L
AIA QHSAD LI AKGG DFSK FP ELKA HAEK IQ AIP QIKK WIE TRP VTPF

```

Spliced mRNA

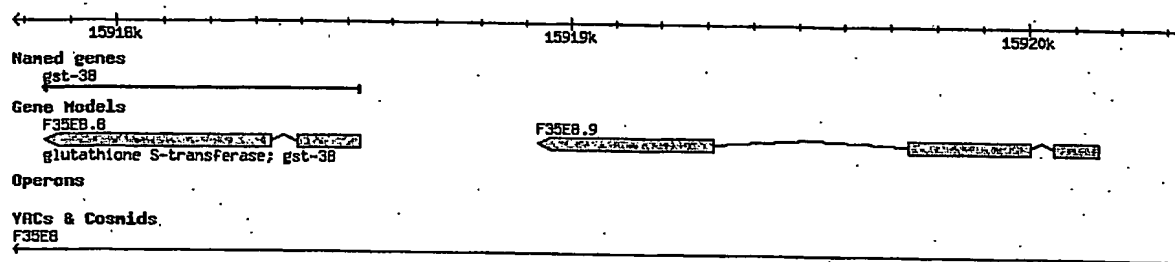
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ATGG TTTCTT ACAAG TTGAC CTA CTTC AAT GGAC GTGG CG CTGG AGAAGT GTCT CGTCAG ATTT TCGCCT ATGC CGGACA
ACA ATACGAG GATA ATAGAG TCA CTCAGGA ACA ATGGCCA GCAT TGAAAG AAAC CTGCGC TGCT CCATTC GGAC AACTTC
CAT TCCTCGA AGTC GACGGT AAGA AGCTTG CTC AATCCCA CGCG ATTGCT CGTT TCTTGG CTCGT GAGTT CAAG CTCAAC
GGAAA AACCG CCT GGAAGA GGCT CAAGTG AACT CTCTTG CCG ATCAATA CAAG GATTAT TCA AGTGAGG CTCGT CCATA
TTTCTACGCT GTCAT GGGAT TCGGTCCAGG AGAC GTTGAA ACT TTGAAGA AAGACATCTT CCTTCCAGCA TTTGAAAAGT
TCTACGGATT CTTGGTCAAC TTCTTGAAGG CTTCGGGATC CGGATTCCTT GTCGGAGACT CTTTGACCTG GATTGACTTG
GCTATTGCC AACATT CAGC TGATTTGATT GCCAAGGGAG GTGATTT CAG CAAGTTCCCA GAGCTCAAGG CTCATGCCGA
GAAGATCCAG GCGATTCCAC AAATCAAGAA ATGGATCGAG ACCCGTCCAG TCACACCATT CTAAatagct gtataaaatc
tgcaaataaa tat tttttttt tttt

```

FIG. 12

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The F35E8.8 gene is located on chromosome V. Regulatory sequences can be found e.g., in the region between 15 917 841 and 15 918 925. An exemplary sequence from in or around this region is as follows:

TCTCATTCTCTTCAAGACATAACACAACGGGCTGACGACCATATCATCAACGACGATTTTTTAGGAACTG
TACTTTATCTGTGTCTGACCAACACGTGTGAATGAAGTTTCAACTGGAAAATTTGTTTGAAACACTGCAA
AGAATTTTGAATTTTGATGATAATTTTAAATGCCATTATCAGTTTTAATACGCCACTCTAGTCTTTGATT
-240

CTTTGCACACACACACACACACACACACACACACACTCACAAACACGCCTGAAATTTGCAATATG
CTGATTTAACGAGAAAACATTTGATGACAATAAACTTGGCGTATTAATATAAAAGGAAAATTCAATTCA
-94

GATTCTCAACGGTTTATTTTCTGTCACAACTCTTCCTAATATTCACCATGGTTT

FIG. 13

Exemplary F35E8.8 (gst-38) sequences:

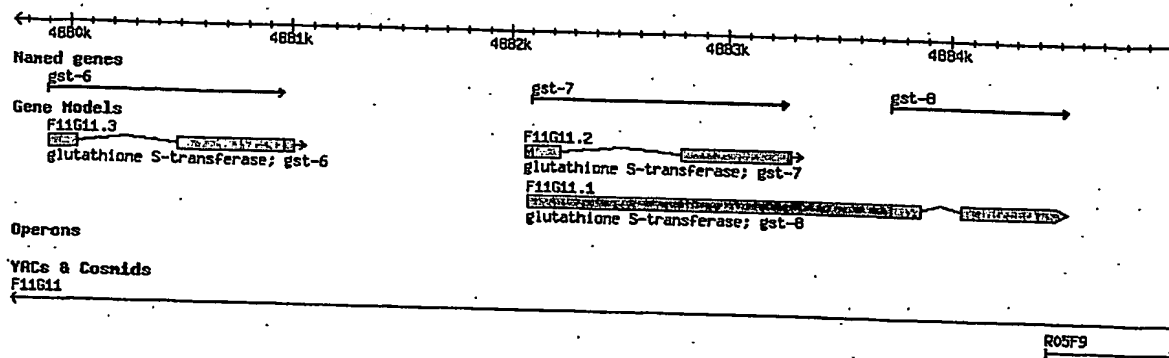
Amino Acid Sequence

MVSYKLTYFD GRGAGELCRQ IFAAAEQKYE DNRLTDEEWE KFKAAAGKTPY NQLPMLEVDG KPLAQSHAMA RYLAREFGFN
GKSREWEEAQV NSLADQYKDY YAEARPYLAV KLGYTEGDAE ALYTSVYLPV FKKHYGFFVN ALKASGSGFL VGNSLTFIDL
LVAQHSADLL GREKSDLFND VPENKAHSEK VQSIPQIKKW IETRPASDW

Spliced mRNA

ATGGTTTCCT ACAAGCTTAC CTACTTCGAT GGACGCGGAG CCGGAGAGCT CTGCCGTCAA ATCTTTGCTG CCGCCGAGCA
GAAATATGAA GATAACAGAC TTACCGATGA GGAGTGGGAG AAGTTCAAAG CGGCCGGAAA AACCCCATAC AACCAGCTTC
CAATGCTCGA GGTAGATGGC AAACCACTCG CTCAGTCCCA CGCGATGGCT CGTTATCTTG CTCGGGAATT CGGGTTCAAC
GGAAAGAGCA GATGGGAAGA AGCTCAAGTC AACTCCTTGG CCGACCACTA CAAAGACTAT TACGCGGAGG CTCGTCCATA
CCTCGCTGTG AAGCTTGGTT ACACAGAAGG AGACGCGGAG GCTCTTTACA CAAGCGTCTA TCTTCCAGTT TTCAAGAAAC
ACTATGGATT CTTTGTCAAT GCTTTGAAGG CCAGCGGGTC AGGATTCTTG GTTGGAATTT CCTTGACTTT TATTGATTG
CTTGTGCTC AGCATTACG TGATTGCTG GGACGTGAAA AGTCGGATCT TTTCAATGAT GTCCAGAGA TGAAGGCACA
TTCCGAAAAA GTTCAGTCAA TTCCTCAGAT CAAGAAATGG ATTGAGACTC GTCCAGCGAG TGACTGGTAA

FIG. 14



The F11G11.2 gene is located on chromosome I. Regulatory sequences can be found e.g., in the region between 4 880 968 and 4 882 068. An exemplary sequence in or around this region is as follows:

```

AATTGAAATGAGTTTGCAATTTTGTATTATTTTAAATTCATATTTCAAGAAGCAATTTTTGCTAATTTGTTTTAATGG
AAATCGATGTTTCTAAATATCTTGAATGAATTGTTCTTTAAAAATTTATGGTAAAGTTTTTCAGCAGGATGTTTCTAT
AGAAGCTTTTGCATTGCAAGAGTGTTGAAATATACAGGATATTTACAAAAGCCTGGGAAGTAGGCATGCTTTTAGGTAC
AAATCAGACCTACACCGCCTTCCTTTGTGGTTTACCATCATAGCTAAAACCTTCCGAACATTCCTGGTGAGACACAATG
TTCAAAGCACAAAACCAATCACGTCATAATGTTAATTTGACTTTTATTGTCAAAAATTACAAAAGCGTCGTTTTCTGGAA
CATGAACATAATAAGAATTTTCAAATTTCCGGTGGGCACAATAAATATGTAATCTTTTATTTTATTTTGGAGGATAGTCTT
TTCAAAGGCAGGTGTATAACCCTCAAAGAAAGCACGTTTGTGTTTCAAAGTGAGACTTAAATTTATTTCAAAGACAAATT
CCATAGGAAATCATTGTTTCATCAGGCACCTTCCCAGAAATTAGGCTGTAGGCAGGCACGTAGGCTGCGGTAAATGCCTAC
GCCTCTTTTGC GCGAGATTATGAAATTGTGTTGTACTGTGCGAAAAATTTAGAAACAAAAAATATTTTTTGTGACT
TTTTGTGTCAGTTATAGTAGTTTCTTATCATGGTATCTTCAATAATAATGGCAAGCGTAAC

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AAGATGATTGATGCCATGGGTTTATATTTGTGAGTAGTCACAAATTGTGACACAACATTCCTTCGAAAGATCTGGAAAA
GTCACAAAACCTTGCAATATATTTTTTTCAACCAATATTATTTTGACCTACTCTGTTTCATCGTAACATTGCAACAACAAA
AACGATGACTACACTTTATGATTTCTAGTCAACAACGTGCGCGCAATGTGTAGAGCAAATGATGACAACTACAGAATAT
GGTGAGTGGAGAGACGACAGACATTTGAGAAATGGGTATAAATA

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GAGACGGCCGGCATTTCAGTGTTCAACCCTTCTCATCGACCACTCGATTCTTGCTTGGTTATTTCAACAATG

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FIG. 15

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Exemplary F11G11.2 (gst-7) sequences:

Amino Acid Sequence

MVHYKVSYPF IRGAGEIARQ ILAYAGQDFE DNRIPKEEWP AVKPSTPFGQ LPLLEVDGKV LAQSHAIARY LARQFGINGK
 CAWEEAQVNS VADQFKDYLN EVRPYFMVKM GFAEGDLDAL AKDVFLPGFK KHYGFFANFL KSAGSGYLVG DSLTFVDLLV
 AQHTADLLAA NAALLDEFPQ FKAHQEKVHS NANIKKWLET RPVTPF

Spliced mRNA

cgaccactcg atttcttgct tgggtatttc aacaATGGTC CACTACAAGG TATCGTACTT CCCAATTCGT GGAGCTGGAG
 AGATTGCTCG TCAGATCTTG GCCTACGCTG GACAAGACTT CGAGGACAAC AGAATCCCAA AGGAGGAATG GCCAGCTGTC
 AAGCCAAGCA CTCCATTCCG ACAGCTTCCA CTCCTTGAAG TTGACGGAAA GGTTCTTGCC CAATCTCATG CTATCGCCCG
 TTAATTGGCT CGTCAGTTCG GAATCAATGG AAAGTGTGCA TGGGAGGAGG CTCAAGTCAA CTCGGTTGCT GATCAATTCA
 AGGATTACCT CAACGAAGTT CGTCCATACT TCATGGTGAA GATGGGATT TCTGAAGGAG ATCTCGATGC TCTTGCCAAG
 GACGTCTTCC TTCCAGGATT CAAGAAGCAC TATGGATTCT TTGCTAACTT CCTCAAGTCG GCTGGATCCG GATACTTGGT
 TGGAGACTCT TTGACCTTTG TCGACTTGCT CGTCGCTCAG CACACTGCTG ATCTTCTGGC TGCCAACGCA GCTCTTCTCG
 ATGAATTCCC ACAATTCAAG GTCATCAGG AAAAGGTTCa CTCGAATGCC AACATCAAGA AGTGTTTGA GACTCGTCCA
 GTTACTCCAT TCTAAatgat ttcca

FIG. 16

The K08F4.7 gene is located on chromosome IV. Regulatory sequences can be found e.g., in the region between about 10141800 and 10142217. An exemplary sequence of this region is as follows:

ATTATCCAAAAGATTAGAAGTTGGCAAACCTTGGGCAAGAATTTCCAGAGATTGCACATAAGTTGTAGCCAAGTTTGAT
CCAACTTTATCCAATCTTTTACTAAAATTATCCTTAAGACTATTTAAATTTTAGATAGAGAATTGGCGAGAGTTAGATCC
CACTTGGATATGACTTATAGTTAGCCTAACCTGAAGCTATTGCTTGCTTGATCATTTGGTTTATCGCTTTGCTACTTGGA
TAACCAGCTCCAATAGTTGTTATTTTGTCTTTGTCATCATTTT

-157

TCCACGATTTACACTCTCAAGTGAAACCAACTGTTCTTTGATGCCAGACGATGACATTACACTTGATAAGA

-83

AAATATATATAAACTGGAATTAAAAACAATTGATACATCGATTCAATTACTGAATTCTAATTATG

FIG. 17

Exemplary K08F4.7 (gst-4) sequences:

Amino Acid Sequence

MPNYKLLYFD ARALAEPIRI MFAMLNVPYE DYRVSVEEWS KLKPTTPFGQ LPILQVDGEO FGQSMSITRY LARKEGLAGK
TAEEEAYADS IVDQYRDFIF FFRQFTSSVF YGSDADHINK VRFEVVEPAR DDFLAIINKF LAKSKSGFLV GDSL TWADIV
IADNLTSLK NGFLDFNKEK KLEEFYNKIH SIPEIKNYVA TRKDSIV

Spliced mRNA

ATGCCAACT ATAAGCTATT GTATTTTGAT GCTCGTGCTC TTGCTGAGCC AATCCGTATC ATGTTTGCAA TGCTCAATGT
GCCTTACGAG GATTATAGAG TTTCAGTGGA AGAATGGTCA AAGCTGAAGC CAACGACTCC ATTTGGCCAG CTCCCATT
TACAAGTCGA TGGAGAACAA TTCGGTCAGT CAATGTCTAT CACAAGATAC TTGGCAAGAA AATTGGGACT CGCTGGAAAA
ACTGCAGAGG AAGAAGCTTA CGCTGATTCA ATTGTAGATC AATACAGAGA TTTCATATTC TTTTCCGTC AATCACTTC
TTCCGTTTTT TATGGAAGTG ACGCTGATCA TATTAACAAA GTACGTTTTG AAGTTGTTGA ACCAGCCCGT GATGATTCT
TGGCAATAAT CAATAAGTTC CTGGCCAAGA GTAAATCAGG ATTCCTCGTT GGAGACTCAT TGACTTGGGC TGATATTGTG
ATTGCTGACA ATTTGACAAG TCTCCTGAAG AATGGATTCT TAGATTTCAA CAAAGAAAAG AAGTTGGAAG AGTCTATAA
CAAGATTCAT TCAATTCCAG AAATTAAGAA TTACGTGGCA ACAAGAAAGG ATAGTATTGT TTAAaatcga attatttaag
tctgaattat gtatgtagta aaataatc gttcctatca cgtctcccag agagcgtaat aaattattat tatgtg

FIG. 18

The *sod-1* gene is located on chromosome II. Regulatory sequences can be found e.g., in the region between about 6 973 806 and about 6 974 406. An exemplary sequence of this region is as follows:

```
ATTCCGCAACCCCGTCAAATTTAAGAAGAGAAAGAAAAAAACACAACGTGTTTGCACCTGTAAGGTAGT
TTTTTTTTGTTGCCTTCGGCGTTTTGATTCACATGAAAGTTTCTACGGAAAACTTTCATTGCATAACGA
TCTTCATATCTTGTCTTGGAACGAAAATTTCCAACATGAAAGAAACCCGACGCTATTTATTCTCGCAA
CACAAAAATTCACATTTAAATAACCGCGTTTTTCTCGAACAGCATATTTGACGCGCATTGCTCGTCAA
GTTTGATGCGTGCACACTATTTTGCTGTTGTTTTTTCTTTTTCTCTAAATTTTCTTTACGCTTTCGTA
GTTTCTATAGAAACGATTCTCCACTCCCGTTTTCTTCCGATTCTCAAATTAATTAAAATTTAGTTATT
AAAAATCCTTTTTCTTGAAATAATCGTTCAATTTTCGAGTTTCAAGAGTGGAGACGTTGAATTTGTGAGC
CGCTTATTTTTCTGTGTTTTTGTGTTTTTAATCAGTGTCATAATCATACTTTCCATTGTTTCT
```

-64

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TTATTATTCAAAGTTGTAGATTCAGTATTTTAGATCGGTGATG
```

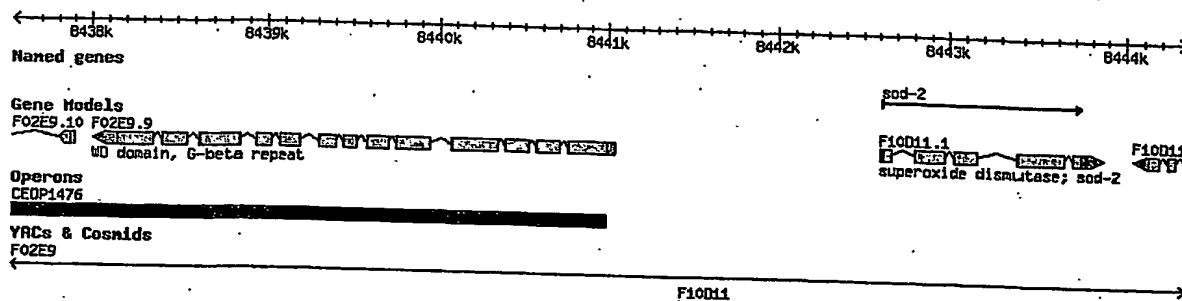
FIG. 19

Exemplary sod-1 sequences:

Amino Acid Sequence									
MFMNLLTQVS	NAIFPQVEAA	QKMSNRAVAV	LRGETVTGTI	WITQKSENDQ	AVIEGEIKGL	TPGLHGFHVH	QYGDSTNGCI		
SAGPHFNFFG	KTHGGPKSEI	RHVGDLGNVE	AGADGVAKIK	LTDTLVTLYG	PNTVVGRSMV	VHAGQDDLGE	GVGDKAEESK		
KTGNAGARAA	CGVIALAAPQ								

Spliced mRNA									
ttagatcgg	tgATGTTTAT	GAATCTTCTC	ACTCAGGTCT	CCAACGCGAT	TTTTCCGCAG	GTCGAAGCCG	CTCAAAAAAT		
GTCGAACCGT	GCTGTCGCTG	TTCTTCGTGG	AGAAACTGTT	ACCGGTACTA	TCTGGATCAC	ACAGAAGTCC	GAAAATGACC		
AGGCAGTTAT	TGAAGGAGAA	ATCAAGGGAC	TTACTCCCGG	TCTTCATGGA	TTCCACGTTT	ACCAATATGG	TGATTCCACC		
AACGGATGCA	TTTCTGCCGG	TCCACACTTC	AATCCATTG	GAAAGACTCA	TGGTGGACCA	AAATCCGAGA	TCCGTCACGT		
AGGCGATCTA	GGAAATGTGG	AAGCTGGAGC	CGATGGAGTG	GCAAAAATCA	AGCTCACCAG	CACGCTCGTC	ACGCTTTACG		
GTCCAAACAC	TGTCGTTGGC	CGATCTATGG	TTGTTTCATG	CGGACAAGAC	GACCTCGGCG	AGGGAGTCGG	AGACAAGGCA		
GAAGAGTCCA	AGAAGACTGG	AAACGCCGGA	GCTCGTGCTG	CCTGCGGTGT	CATTGCTCTC	GCTGCTCCCC	AGTGactacc		
tgaatcgcgt	ctctgaatct	ccacacaatt	cctactaaag	acaatttttc	atttcttgct	ttgtcggtat	attcttaaga		
atcccgttgt	tcctactcct	actactgtat	attttcacat	aaaattttct	caaaatttca	aataaagggt	gtagtttc		

FIG. 20



The *sod-2* gene is located on chromosome I. Regulatory sequences can be found e.g., in the region between about 8 441 038 and 8 442 612. An exemplary sequence of this region is as follows:

TGAATAAAACGTTGAACCCAACGGACATCAAAGTATCAAAGTAAGTAAGTAAGTAACCTGAATAAAACGTTGCA
TATAAAAATCTACTCGAAAATTAAGTGAGAATTGAAGGATTGCTTTCCGAAGAGAAAATGACAATTATAGGGTATACTA
AAACATCAAAAATGTATATTAGACTACCATAAATATAAAACATCAGTGCTGCTCTCCAAGCTATTCTGACGGATTGCGAC
AACGAGCTCGCTGGAGTTGGCATCAGTGTGGAAGGCAGACACATAAGAAGACTCGAATTTGCGGATGACGTAGTCCTGAC
ATGTTCCACACCGGGGAGAAGTTCAAGAACGACTGGAATTTTGGACCGAATAAGTTCTAATTACGGACTCAAGATCAATC
AGTCAAAGACTGTTCTTCTGAAGAACAAGTTTTGCCGGAGCCAAGACGTCCTTTTCAACGGATCCCCATCATTCCCGTG
CCTGGTTGCCGCTATCTGGGTCGCTGGATCGACATTTCTGGCTCAATTGACGAAGAGATCTCGAGGAGAATAAGAGCAGG
TTGGGGTCTCTGTTTGAATCAAAGAAGTCTTGAGAATCATGCCAAACAAGGAAGAATCATCCTCTTCAAGCAAAAT
-980 -959

GTGCTACCAGCTCTCCTGTATGCTAGTGAACTTGGACTTGTAAATGCTGGATCCACGTTGAGACTCAAAAAGAACTGTCAC
CGGTCTCATCGACGCTGCAGAAATTCGAGGCTGGAACCTCAACTTGGAAACGTTACCTCCTTGCAAAAACAATCAAGATTTG
CAGGACACATTCTACGGAGAGATCCAAACCGATGGACAAAATCTGCACGGAATGGGACCCGAGCCACAACAAAATTTGG
AAACGTGCCGTTGGAGGACAGAAGAAGAGATGGGCTAAGGACATCGACGAAGAATACGCAAAATTCACCACAATTCCGC
CATGTCGGGACAAGTCGTTGTTGGGAGAAGAAGACTAGGAATGCTCACTCCGAAGGCTCCATGGCTGTCCATCGCACGAA
CCGACCGTGAAAAATGGAAGAGTTTGTCCGCAGTTGCCCTCGCAACTTGAACCCAACGGACATCAAAGTATCAAAGTAAG
TAAGTAAGTAAGTAACCTGAATAAAACGTTGCAATTAAAAATCTACTCGAAAATTAAGTGAGAATTGAAGGATTGCTT
TCCGAAGAGAAAATGACAATTATAGGGTATACTAAAACATCAAAATGTATATTAGACTACCATAAATATTACGATAAT
-363

TTAAAAATTACTAGAAACACGCAATTCGGCTCAAAAAGCAACAATTTAGACTGAAAACGAGCTAAAAGAATATTATTCAA
AAACCACTTTGCTCGGTAAATCTGGTGTATCATGTTCCGCAAAACACTGTCTTTTGTGTTTGGC
-191

TACTTTGTTTACGCGCATTCGAATTTTCAAGTGTTCGCGCTTTTGTGTTTACTTTTTTATTTTTTATCCAAAAATCGTATTTT
CAGCTTGATATGTTTCTGCGAATTGTAAAAATTTATATTTGACTATTGAATATTTTAATTATTTGACGCCGAAAATG

FIG. 21

Exemplary sod-2 sequences:

Amino Acid Sequence

MLQNTVRCVS	KLVQPITGVA	AVRSKHSPLD	LPYDYADLEP	VISHEIMQLH	HQKHATYVN	NLNQIEEKLH	EAVSKGNVKE
AIALQPALKF	NGGGHINHSI	FWTNLAKDGG	EPSAELLTAI	KSDFGSLDNL	QKQLSASTVA	VQSGSGWGLG	YCPKGKILKV
ATCANQDPLE	ATTGLVPLFG	IDVWEHAYYL	QYKNVRPDYV	NAIWKIANWK	NVSEFKAQ	Q	

Spliced mRNA

tttgcagccg	aaaATGCTTC	AAAACACCGT	TCGCTGTGTC	TCAAAGCTTG	TTCAACCGAT	CACAGGAGTC	GCTGCTGTTC
GCTCGAAGCA	CTCGCTGCCA	GATTTACCAT	ACGACTATGC	TGATTTGGAG	CCTGTAATCA	GTCACGAGAT	TATGCAACTT
CATCATCAAA	AGCATCATGC	CACTTATGTG	AACAATCTCA	ACCAAATTGA	GGAAAAGCTT	CACGAGGCGG	TCTCCAAAGG
AAACGTCAAA	GAAGCTATCG	CTCTTCAGCC	AGCTCTCAAG	TTCAATGGAG	GAGGACATAT	CAACCACTCC	ATCTTCTGGA
CTAATTTGGC	AAAGGACGGA	GGAGAACCAT	CGGCGGAGTT	GCTCACCAGC	ATTAAGAGCG	ACTTCGGATC	TCTGGATAAT
CTTCAAAAAC	AGCTTTCGGC	ATCAACTGTC	GCTGTTCAAG	GATCAGGATG	GGGATGGTTG	GGATACTGTC	CAAAGGGAAA
GATCTTGAAG	GTTGCCACAT	GTGCCAATCA	GGATCCACTT	GAGGCAACAA	CTGGACTTGT	TCCACTGTTC	GGAATTGACG
TCTGGGAGCA	CGCTTACTAC	TTGCAGTACA	AGAATGTTG	ACCAGATTAT	GTCAATGCTA	TTTGGAAGAT	CGCCAACCTGG
AAGAACGTCA	GCGAGCGTTT	TGCAAAGGCA	CAGCAATAAa	tgagctgaat	cacaagaatt	aatcgtcaaa	tgtagcagta
gaagttgact	cccattgttt	tgtaactatt	tttgtttctt	aattatttcg	aaatgtaa	tttcaa	acct tttcaaatga
aaagttttca	ccg						

FIG. 22

The *ctl-1* gene is located on chromosome II. Regulatory sequences can be found e.g., in the region near 14 306 135. An exemplary sequence of this region is as follows:

```
AAAAAAAAATCGATAAAAAATCCGCGTCAACGAAAGTTTAAAGTTACAGTATTTGTCGTTTCGAGACCGG
GTACCGTAGTTTTTGGTGAAAACATTGCAAAATTTGGTCAACAATTTTCATCGCTGCGAGACCGACACAAC
ACTTTATTTTATTTTGGGTTTCCCTTATCGCTTATCATAAACATGTGACGTCATCATCTCTGTACAGA
                -997                -978
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GCACCGCGACTGGGAGTATAAGAATCGCCGGAACATCAATAATCAGTTCGGTAGAAGTGAAAATTGAG
CGTAAATATGATCATTTTTTCGATGCACCATATTTGACGCGCAATACTTCTACAAGCCGCTGTGTACTGC
-880
```

```
TCGTGGACAACTTTGGATTATTTTTGTTTTTAAAATTCAAATAGTCAATATATTGCTTATTTATAGCG
CGCCTTTTTGACAGTAAGTTTGTCAAATTTGCGCGTAAGTTATGGTGTTCACATATGCACCATACAGC
AACACCCCGCGCCCGGCTAGTGGTACATCCATGCAAATGCGCTCTACTGATAATTTGAGTTTAACCAGG
TTTAGGCGCAAGATAAGAAAAAGCTTTGGACCAAAAAATTTAGAGTTTATTTTTTTCGGACATTTTTTA
TATACATCACAAAAATATTGGGCCACTCGTTTTTGATAAAAACGACAAGCCCAAAAGTTCAGGTATACGG
TAGACAAATTGCGTACAGGTACCACTTTTCCACGTAGTGCCAGGTTGTCCATTACGCTTTGATCTATGA
AAAATGCGGGAATTTTCGTCCAGAAAAATGTGACGTCAGCACGTTCTCAACCATGCGAAATCAGTTGAA
AACTCTGCGTCTATTCTCCGCATTTTTTGTAGATCTGTAGATTTGTAGATCAATCCATTCCCGTATAC
CCTGACCCATAATCAATACCTACCTAATTTTTGTCTTTCCCCCTACTTTTTTGCTGTCCAAAATAAGCG
AGACTATGCCGTAGTCTGGTGTCCAACAACATGTTCTTATCAGTGATAACGCTACAATCTTCTTTCTTT
TTTCTCTGTTTCTTGTCTCTCCCAACCCATATTCGGTATTACACCTCGTCGTGGTCATTTTTTTGTTT
AGAGTTTTATTTAATTCTAAATTTCTAACTAAAATTTTCTCAGA
```

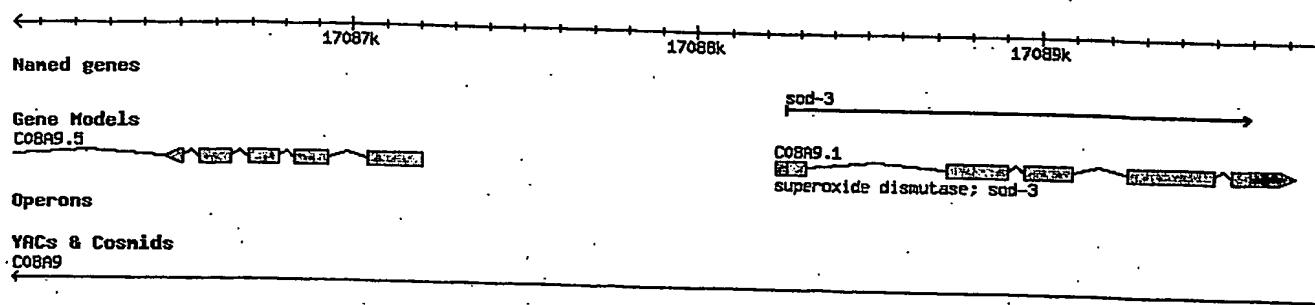
FIG. 23

Exemplary ctl-1 sequences:

Amino Acid Sequence									
MPNDPSDNQL	KTYKETYPKP	QVITTSNGAP	IYSKTAVLTA	GRRGPMLMQD	VVYMDEMAHF	DRERIPERVV	HAKGAGAHGY		
FEVTHDITKY	CKADMFNKVG	KQTPLLVRFS	TVAGESGSAD	TVRDPRGFSL	KFYTEEGNWD	LVGNNTPIFF	IRDAIHFPNF		
IHALKRNPOI	HMRDPNALFD	FWMNRPESIH	QVMFLYSDRG	IPDGFRFMNG	YGAHTFKMVN	KEGNPIYCKF	HFKPAQGSKN		
LDPTDAGKLA	SSDPDYAIRD	LFNAIESRNF	PEWKMFQVM	TFEQAQKWEF	NPFVDVTKVWP	HGDYPLIEVG	KMVLNRRNVKN		
YFAEVEQAAF	CPAHIVPGIE	FSPDKMLQGR	IFSYPDTHYH	RLGPNYIQLP	VNCPYRSRAH	TTQRDGAMAY	ESQGDAPNYF		
PNSFRGYRTR	DDVKESTFQT	TGVDVRYETG	DDHNYEQPRQ	FWEKVLKEEE	RDRLVGNLAS	DLGGCLEEIQ	NGMVKEFTKV		
HPDFGNALRH	QLCQKKH								

Coding									
CTGAAAACCT	ACAAGGAGAC	GTATCCAAAA	CCCCAAGTGA	TCACAACTTC	aaaATGCCAA	ACGATCCATC	GGATAATCAA		
CGTGCTCACC	GCCGGGCGGC	GTGGCCCAAT	GCTCATGCAA	GATGTAGTTT	AAATGGAGCT	CCGATCTACT	CGAAGACCGC		
AACGTATCCC	CGAGCGTGTC	GTTTCATGCCA	AGGGAGCCGG	AGCCCATGGA	ATATGGATGA	GATGGCTCAT	TTCGATCGTG		
TACTGTAAAG	CCGATATGTT	CAACAAGGTC	GGAAAACAGA	CACCACTTCT	TACTTCGAGG	TCACCCATGA	CATCACCAAG		
GGGATCCGCT	GATACTGTCC	GCGATCCACG	TGGATTCTCT	CTCAAATTCT	CGTTCGTTTT	TCAACGGTCG	CTGGAGAATC		
GAAATAACAC	TCCGATCTTC	TTCATTCTGT	ACGCAATCCA	CTTTCCGAAT	ATACCGAGGA	GGGTAACGGG	GATCTGGTTG		
ACTCACATGA	GGGATCCGAA	TGCGCTCTTC	GATTTCTGGA	TGAATCGCCC	TTCATTCTATG	CCCTGAAGCG	CAATCCACAG		
CTCGGATCGT	GGAATTCCTG	ATGGATTCCG	TTTTATGAAT	GGATACGGAG	TGAATCCATT	CATCAGGTGA	TGTTCTCTTA		
GAAATCCGAT	TTATTGTAAA	TTCCATTTC	AGCCTGCTCA	AGGTTCGAAG	CGCATACTTT	CAAGATGGTC	AACAAGGAGG		
GCCTCTTCGG	ATCCAGACTA	TGCGATCCGC	GACCTGTTCA	ATGCCATTGA	AATCTCGATC	CAACTGACGC	TGGAAAGCTC		
CATTCAAGTG	ATGACATTCTG	AACAAGCTGA	GAAATGGGAG	TTCAATCCAT	GTCAAGAAAT	TTCCCGGAAT	GGAAGATGTT		
ATTACCCACT	GATCGAGGTC	GGCAAGATGG	TGCTGAACAG	GAATGTGAAG	TTGATGTCAC	TAAAGTTTGG	CCACACGGTG		
TTCTGCCCGG	CCCACATCGT	CCCAGGAAATC	GAGTTCTCGC	CAGACAAGAT	AATTATTTCG	CTGAGGTCTGA	ACAAGCCGCC		
CACGCATTAC	CATCGCCTTG	GACCAAACTA	CATTCAAGCTT	CCAGTCAACT	GCTCCAAGGG	CGTATCTTCT	CCTACACGGA		
AACGCGATGG	TGCAATGGCT	TATGAAAGCC	AGGGAGATGC	GCCGAATTAC	GCCCCGTACCG	CTCCCGTGCT	CATACCACTC		
CGTGATGATG	TGAAGGAGTC	GACATTTTCTG	ACGACTGGAG	ATGTTGATCG	TTCCCGAACA	GTTTCCGCGG	ATACCGTACT		
GCAGCCACGT	CAGTTCTGGG	AGAAAGTGCT	CAAGGAGGAG	GAGAGAGATC	TTATGAGACT	GGAGACGATC	ACAACCTACGA		
GTGGCTGTTT	GGAGGAAATT	CAAAATGGAA	TGGTCAAAGA	GTTCAAGAAA	GGCTCGTTGG	GAATTTGGCT	AGTGATTGTTG		
CATCAGCTCT	GCCAGAAGAA	GCATTAAatt			GTTTATCCGG	ATTTTCGGAAA	TGCTCTTCGC		

FIG. 24



The *sod-3* gene is located on chromosome X. Exemplary regulatory sequences include:

TATTCGCAGAAAAAGTCGTTGCAAACATTCGTTTTTATATGTTTTTCTTTGAGAAAGCGTGGTTTCATTT
 TTGAAAGTGAAAAATATTTGCTTAAACCTTCCAAATTTAAATCTGCAGTGATTCAGAGAGGTTGAGAATT
 ATTTTCAAAAACATTCATGTTTTCCCTTGGAGTGACTATGCAAATATGAAAATGTTTTCCAAAAATATT
 TGGATGCCCTGATAAAAAGTAGGTGAAATTTTCGCAGGGGAACATCATATTAAAATGTTTGAATTTTTAGAA
 GAAATGGAAATGTTTGTCTGGTGGTATGCTCGAATATTTGAGATATTATATATTTACTGTAAATCCGAAA
 TTTTTCAGCAAACGAAAAAATTTGTGTCGAAATACTACATTTTCGATAACACAAAGGTACTTCCATAACA
 CTTATAAAAACTGTTTGACTATCTTATTTTCAGGAAAAAATCCAAGAATAAACATTTTTCAGAAATTTG
 AACTTTCTAATGGCTGATTAATAAAACAAAGTTATACAACATTTCAAAGCAGTTGCTCAATCTGGCATT
 TCTTGTGTTTTTTTTTGAATATTTTCATCAGCAAGATGTTGATAATTTTGTGTTAATTCTAATTGTTTCT
 ACAATTTTTCAAACCGAAAAATTGACCTTTGACTTTGTTTACTTTGTTCTCGTGGGTAACTGTTCACTGA
 TTTCTATTGCTGTTGATGAGGTCTTTGATCAAATTTGTATTGTTTTTATACTGCATATTGCTTCAATTCT
AAATCATCTAATATATTGTCAAACAACCTTCTGTTTTTTTTTTCATTCAAACCTTCTGCAAAAACGTTCT
 -287

CTTAACAAAGGTTTCACACAACAACCTCTCCTCTCCATCTCTTTCTCTCAACAACAATGTGCTGGCCTTGCA
 TGTTTGCCAGTGCGGGTGTGTTTACGCGTTTCAAGATTTTGGTCTCCTATCTAACGTCCCGAAATGCAT
 TTTTTCCTTTTCAATTTGGTTTTTTTCTGTTTCGAGAAAAGTGACCGTTTGTCAAATCTTCTAATTTTCAGTG
 AATAAAATGCTG

FIG. 25

Exemplary sod-3 sequences:

Amino Acid Sequence

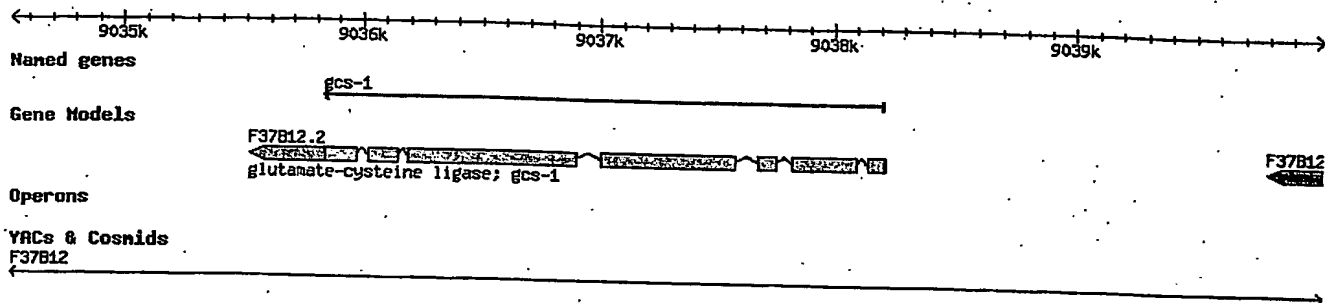
MLQSTARTAS	KLVQPVAGVL	AVRSKHTLPD	LPEDYADLEP	VISHEIMQLH	HQKHATYVN	NLNQIEEKLH	EAVSKGNLKE
AIALQPALKF	NGGGHINHSI	FWTNLAKDGG	EPSKELMDTI	KRDFGSLDNL	QKRLSDITIA	VQSGSGWGLG	YCKKDKILKI
ATCANQDPLE	GMVPLFGIDV	WEHAYYLQYK	NVRPDYVHAI	WKIANWKNIS	ERFANARQ		

Spliced mRNA

cgtttgtcaa	atctttcta	tttcagtga	taaaATGCTG	CAATCTACTG	CTCGCACTGC	TTCAAAGCTT	GTTCAACCGG
TTGCGGGAGT	TCTCGCCGTC	CGCTCCAAGC	ACACTCTCCC	AGATCTCCCA	TTCGACTATG	CAGATTGGA	ACCTGTAAATC
AGCCATGAAA	TCATGCAGCT	TCATCATCAA	AAGCATCATG	CCACCTACGT	GAACAATCTC	AATCAGATCG	AGGAGAAACT
TCACGAGGCT	GTTTCGAAAG	GGAATCTAAA	AGAAGCAATT	GCTCTCCAAC	CAGCGCTGAA	ATTCAATGGT	GGTGGACACA
TCAATCATTC	TATCTTCTGG	ACCAACTTGG	CTAAGGATGG	TGGAGAACCT	TCAAAGGAGC	TGATGGACAC	TATTAAGCGC
GACTTCGGTT	CCCTGGATAA	CTTGCAAAAA	CGTCTTTCTG	ACATCACTAT	TGCGGTTCAA	GGCTCTGGCT	GGGGATGGTT
GGGATATTGC	AAGAAAGACA	AAATCTTGAA	GATCGCCACC	TGTGCAAAACC	AGGATCCTTT	GGAAGGAATG	GTCCCACTTT
TTGGAATTGA	CGTTTGGGAG	CACGCCTACT	ACTTGCCAGTA	CAAAAATGTC	CGCCCAGACT	ATGTCCATGC	TATTTGGAAG
ATTGCCAACT	GGAAGAATAT	CAGCGAGAGA	TTTGCCAATG	CTCGACAATA	Aaagcaggaa	atattggaat	tttcggtttt
acgaaaatat	tgaagataat	tcagatgtag	tttaaaacgc	tgagaatttg	tatttttgta	attgttttaa	taaaagaacg
cacagttttt	tctta						

FIG. 26

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The *gcs-1* gene is located on chromosome II. An exemplary regulatory sequence is:

TTATCAACCACTAGGTTCCGCTCTTAATCGTCCAAATATTGATCCGCTCGCTCGTGTTTTCTCAACTTCTTTATTTGCTGT
 GTTTTCTGTTTCTATAGTTCTCCATTTTCCATCTCCTCTTCGCTTGTTGAATGGACTTTATTTTGATAAGTTCATTTTA
 ATTTTCTAACAATCTCATCACTAGCTCATGATGACAATTGCAAAGAAATTCGTCATATAGAGGGGAAAATGCTGACAA
 -607

ATATTGAAAAGCCTTCAGGAGAGATGTAGAGACGTAGGAGTAGAGACAGAACATAAATTTGAGAAGCTTGAGGGAGAAT
 AGACATAGAGTTACCATGGGAAAAACGCTCGCATTTTCCATTTAACGAGATTTTCTAGATCACAACATTTTGTGATCCGT
 TGTGCGAAAATCAAGCTTTTTATCAAACTTTATCGTCTGTTTATTCTTTCTGACAATCTTTATTATCTTATTAACTTG
 ACTAATTGTATTGAAAGTATTTTTTTAGATGCGAACGAAGTTCCATTTTTCATGACTTAACATCTCTTAACGTTAGTGAA
 -316

ATTTTGAATTCCAATTAGGACTACGGTAGGAGTTCTGTAGTTGATTTTCTGAACACTTGTTTTGTAACCTTTCTGAACG
 GATTTTAATATTTCTAAAATTTTAAATTGCAAATCTGAGTCCTATTAAAGATGTTTCATCCGTAAAACCAACAAACAA
 ATATCACTTTATCATCATGAGATTTAATGTTTCCTTTTGATTTTCTGAATTGTTGTACTTTCCTTCAAACGACTTATTGA
 -121

ACTGATGTAACCTTCCTTCTAATGTTATCATTTGTATTTTTTTGCAGAATG

FIG. 27

Exemplary gcs-1 sequences:

Amino Acid Sequence									
MGLLTGKSPL	TWAETVPHID	YIKKHGIAQF	INLYHRLKSR	HGDQLKWGDE	IEYTIVKFDD	ANKKVRVSK	AEELLNKLOA		
EEQVNAMLGT	ANRFLWRPEF	GSYMIEGTPG	MPYGGLIACF	NIVEANMKLR	RQVVKLLKK	DETCLSI SFP	SLGVPGTTFP		
EVAADRKNDD	AANSVFWPEQ	AVFLGHPREF	NLTKNIKGRR	GSKVAINVPI	FKDNTNPSPF	VEDLSALGGP	DDTRDAKPDH		
IYMDHMGFGM	GCCCLQVTFQ	AVNVDEARWL	YDQLTPITPI	LLALSAATPI	FRGKLSNVDS	RWDIIISASVD	DRTPEERGLE		
PLKNSKWVID	KSRYDSTDCY	IYPCSVGYND	IPLQYDETIY	KQLIDGNIDE	PLAKHIAHMF	IRDPHQVFRE	RIEQDDEKSS		
EHFETIQSSN	WMNMRFKPPP	PDAPFEGWRV	EFRPTEVQLT	DFENAAAYCCF	VVLLTRMMIS	FRLTYLMPIS	MVTENMKRAQ		
QKDAVLNQKF	LFRKGLAECK	SAPENLKGSE	KCGPPSQDIE	EMSIDEIING	KKNGFPG LIS	LIRQFLDSAD	VDVDTRCTIS		
QYLNFIKRA	TGEINTLAHW	TRGFVQSHPA	YKHDSVDNDN	IVYDLLKMD	AINGEDHCE	KLLGCYRSKT	DHAISAAVRK		
AEEHMIVSSQ	KRAH								

Spliced mRNA									
tttgcagaAT	GGGTCTTTTG	ACGAAAGGTA	GTCCGTTGAC	GTGGGCAGAA	ACCGTACCGC	ACATTGATTA	TATCAAGAAG		
CACGGAATTG	CTCAATTCAT	CAATCTCTAC	CATCGTCTGA	AATCAAGACA	CGGAGATCAA	TTGAAATGGG	GAGATGAGAT		
TGAATACACT	ATTGTAAAA	TTGATGACGC	AAACAAGAAA	GTTCCGCTGT	CGTGCAAAGC	TGAAGAGCTT	CTTAATAAGT		
TACAAGCCGA	AGAGCAGGTG	AATGCGATGC	TTGGAAC TGC	CAATCGATT C	CTTTGGAGAC	CAGAATTCGG	ATCCTACATG		
ATCGAGGGAA	CCCCCGGAAT	GCCTTACGGA	GGTCTCATCG	CTTGCTTCAA	CATTGTCGAG	GCAAACATGA	AATTGCGCAG		
ACAGGTGCTC	AAAAAGTTAT	TAAAGAAGGA	TGAAACATGT	CTATCGATAT	CGTTCCCATC	TCTTGGAGTA	CCTGGATTCA		
CATTCCCGGA	AGTAGCAGCT	GATAGAAAGA	ATGATGATGC	AGCTAATAGC	GTTTTCTGGC	CAGAACAAGC	TGTATTCTTG		
GGCCATCCAC	GTTTCAAGAA	TCTTACCAAA	AATATTAAAG	GTGCGAGAGG	AAGTAAAGTA	GCTATCAACG	TCCC GATATT		
CAAGGATACG	AACACCCCCA	GTCCATTCGT	TGAAGATTTA	TCTGCACTTG	GAGGTCC TGA	TGATACTCGT	GATGCGAAAC		
CTGATCACAT	TTATATGGAT	CATATGGGAT	TCGGAATGGG	GTGCTGTGTG	CTTCAAGTCA	CTTCCAGGC	TGTGAACGTC		
GATGAAGCCA	GATGGTTGTA	CGATCAGCTG	ACACCGATTA	CACCGATTCT	ACTGGCACTC	TCTGCCGCCA	CACCAATCTT		
CCGTGGAAAA	TTATCCAATG	TCGATTCTAG	ATGGGATATC	ATTAGTGCAA	GTGTCGACGA	TCGTACACCG	GAGGAAAGAG		
GATTGGAACC	TCTCAAGAT	TCGAAATGGG	TTATTGATAA	GAGTCGCTAC	GACTCCACGG	ACTGTTACAT	TTATCCATGT		
TCTGTTGGCT	ACAATGATAT	TCCTCTTCAA	TACGACGAAA	CCATATATAA	ACAACTAATT	GATGGAAATA	TTGATGAGCC		
ACTGGCAAAA	CATATTGCGC	ATATGTTTAT	TCGTGATCCA	CATCAAGTTT	TCCGTGAGCG	TATCGAACAG	GACGATGAGA		
AAAGCAGTGA	ACACTTTGAA	ACAATTCAAT	CATCGAATTG	GATGAACATG	CGATTCAAGC	CACCACCACC	AGATGCTCCA		
GAAATCGGAT	GGAGAGTCGA	ATTCCGGCCA	ACTGAAGTTC	AAC TGACCGA	CTTTGAAAAT	GCAGCATACT	GTTGCTTCGT		
TGTATTGCTC	ACCAGAATGA	TGATCTCCTT	CAGGCTGACA	TATTTGATGC	CAATTTCAAT	GGT TACTGAA	AATATGAAGC		
GTGCTCAGCA	AAAAGATGCA	GTTCTCAATC	AGAAATTCCCT	GTT CAGAAAA	GGATTGGCTG	AGTGCAAATC	TGCTCCCGAA		
AATTTGAAAG	GATCGGAGAA	ATGTGGACCA	CCTAGTCAAG	ATATTGAAGA	AATGTCGATT	GATGAGATTA	TCAATGGAAG		
GAAAAATGGA	TTCC CAGGTC	TCATTTCACT	TATTCGCCAA	TTTCTAGATT	CTGCTGATGT	TGATGTGGAT	ACTCGGTGTA		
CGATTTCTCA	ATATTTGAAC	TTTATTTCTGA	AACGAGCAAC	TGGAGAGATT	AATAC TTTGG	CTCACTGGAC	ACGTGGATTC		
GTACAATCTC	ATCCTGCATA	CAAA CATGAC	AGTGATGTAA	ATGATAATAT	AGTTTACGAT	CTTTTGAAAA	AGATGGATGC		
CATCTCAAAC	GGAGAAGATC	ACTGTGAGAA	GCTGCTCGGA	TGCTACCGCT	CTAAAACCGA	TCATGCCATT	TCTGCTGCTG		
TTCGCAAAGC	TGAAGAGCAC	ATGATCGTGT	CCAGCCAAAA	ACGTGCACAT	TAGgcgataa	ttgattgatt	atgtgatttt		
aatttatttta	tgttctatac	gtcgtgtttc	ccattccttc	taggccttcc	atgattcaca	atttttcgat	gccatatcaa		
tttagttggc	catctacatt	aaattactga	tatgttgatg	ctattttcta	gtaagcagat	gtcagtggtt	agtaattcaa		
aaattttaaac	tctgaatttc	taaatgcttg	ttttttgagt	agtaggaatc	agtaggaatg	gtacattaat	ctgaaaataa		
tttcatattt	atgtacaatg	ctcccctgaa	tccatcatat	aattattatc	cgtgttg				

FIG. 28

T19E7.2c (conceptual translation)

MYTDSNNRNF DEVNHQHQQE QDFNGQSKYD YPQFNRP MGL RWRDDQRMME YFMSNGPVET VPVMPILTEH
PPASPFGRGP STERPTTSSR YEYSSPSLED IDLIDVLWRS DIAGEKGTRQ VAPADQYECD LQTLTEKSTV
APLTAENAR YEDLSKGFYN GFFESFNNDQ YQOKHQQQQR EQIKTPTLEH PTQKAELEDD LFDDELQAQLF
EDVSREEGQL NQLFDNKQQH PVINNVSLS E GIVYNQANLT EMQEMRDSCN QVSISTIPTT STAQPETLFN
VTDSQTVEQW LPTEVVPNDV FPTSNYAYIG MQNDSLQAVV SNGQIDYDHS YQSTGQTPLS PLIIGSSGRQ
QQTQTSPGSV TVTATATQSL FDPYHSQRHS FSDCTTDS S TCSRLSSESP RYTSESSTGT HESRFYGKLA
PSSG\$RYQRS SSPRSSQSSI KIARVPLAS GQRKRGRQSK DEQLASDNEL PVSAFQISEM SLSELQQVLK
NESLSEYQ RQ LIRKIRRRGK NKVAARTCRQ RRTDRHDKMS HYI*

FIG. 29

agccacataa	ttaaagataa	ttaattccgc	gaagc	cctcttttat	cacataaaat	ctcggtcgaa	accttattta
atthtgatct	actctttcct	cccttcggat	cacaataatc	gtttttttct	gtttttttct	tctttgcoct	gtctcatttc
ccacaaagt	agcaaacct	atcttgcaac	tctttgatt	cccagtgaaa	tacctcacc	acttcaatcc	acttcaatcc
ttatctgatc	cccatccct	tgtcgcctct	agtthtatca	tctcttcac	ataccagtt	tgataattta	tgataattta
ctacatctcc	gaatcatcat	acaaatagat	cattagtatc	ctagtttttc	atthtgagccc	ggagctcaga	ggagctcaga
acccccccat	cctgttcacc	cccatacac	agaaaacgggt	ctcgtgacga	aagaatacgt	gcaccacacg	gcaccacacg
aaatctctcg	taatatcgta	tcaatttct	tgaaaaatat	gatctttaca	gttattttcta	ttatatcctc	ttatatcctc
atctattctt	tttcttgat	ttttggaact	cttctttttt	gtcattttca	atthttctca	aatttctcag	aatttctcag
ctcttgata	ttttcatata	tgtccatata	tgtatccctc	ctccatcccc	agaactcccc	ttcccagtta	ttcccagtta
			tcgthtgaa	ctctcattta			

MSLPDSDFASS	LLASSTTTNT	TNTAPAAVNS	FDEQEEESKK	ILNMYLOMFN	QQQVDQHGH	HQHPYAYSGV
SSTFDRVFPT	SNYAYIGMQN	QSLQAVVNSG	QIDYDHSYQS	TGQTPLSPLI	IGSSGRQQHT	QTSPGSVTVT
ATATQSLFDP	YHSQRHSFSD	CTTDSSTSC	RLSSESPRYT	SESSTGTHES	RFYGLAPSS	GSRYQRSSPT
RSSQSSIKIA	RVPVLASGR	KRGGRSKDEQ	LASDNELPVS	AFQISEMSLS	ELQQVLKNES	LSEYQRLIR
KIRRRGKNKV	AARTCRQRR	DRHDKMSHYI	*			

FIG. 30

[illegible]

ataaaatctc	ggtcgaaacc	ttattaaagc	cacataatta	aagataatta	attccgccac	aataatcggt
tttttcttct	ttgcggtgtc	tcaatttcatt	ttgatctact	ctttcctccc	ttcggattct	ttgatttccc
agtgaataac	ctcaccctact	tcaatcccca	caaagtggagc	aaccctctac	ttgcaacagt	tttatcatct
cttcatacata	cccagtttga	taattttatta	tctgatcccc	atccccctgt	cgctctctcat	tagtatccta
gttttttcatt	tgagcccgga	gctcagacta	catctccgaa	tcatcataca	aacaggtctc	aaaattatgat
gtgacgaaag	aataogtgca	ccacacgacc	ccccatcct	gttcaccccc	atacacctga	ctttttttgtc
ctttacagtt	attttotatta	tatcctcaaa	tctctcgtaa	tatogtatca	atttctctct	ctttttttgtc
attttcaatt	ttttctcaaat	ttctcagatc	tattcttttt	cttgatatttt	tggaacttgt	atccctcctc
catccccaga	cttccccttc	ccagttactc	ttgtacattt	tcatatatgt	ccatatatcg	tttgaatctc
tcattttaagg	aaataaaattt	gaaaaaatc				

T19E7.2a (conceptual translation)

MGGSSRRQRS TSATRRDDKR RRRQCFSSVA DDEEETTSIY GVSSIFIWIL ATSSLILVIS SPSSNTSIQS
 SSYDRITTKH LLDNISPTFK MYTDSNNRNF DEVNHQHQQE QDFNGQSKYD YPQFNRP MGL RWRDDQRMME
 YFMSNGPVET VPVMPILTEH PPASPFGRGP STERPHTSSR YEFSSPSLED IDLIDVLWRS DIAGEKGTRQ
 VAPADQYEC D LQTLTEKSTV APLTAEENAR YEDLSKGFYN GYFFSNFNNQ YQOKHQQQQR EQIKTPTLEH
 PTQKAELEDD LFD EDLAQLF EDVSREEGQL NQLFDNKQQH PVINNVSLSE GIVNQNANLT EMQEMRDSCN
 QVSISTIPTT STAQPETLFN VTDSQTVEQW LPTEVVPNDV FPTSNYAYIG MQNDSLQAVV SNGQIDYDHS
 YQSTGQTPLS PLIIGSSGRQ QQTQTSPGSV TVTATATQSL FDPYHSQRHS FSDCTTDS S TCSRLSSESP
 RYTSESSTGT HESRFYGKLA PSSGSRYSQRS SSPRSSQSSI KIARVPLAS GQRKRGRQSK DEQLASDNEL
 PVSAFQISEM SLSELQQVLK NESLSEYQRQ LIRKIRRRGK NKVAARTCRQ RRTDRHDKMS HYI*

FIG. 31

Human Glycogen synthase kinase-3 beta (GSK-3 beta).

```
1 msgrprttsf aesckpvqpp safgsmkvsr dkdgskvttv vatpgqgpdv pgevstytdk  
61 vngnsfgvv yqaklcdsge lvaikkvlqd krknrelqi mrklchcniv rlyffysg  
121 ekkdevylnl vldyvpety rvarhysrak qtlpviyvk ymyqlfrsla yihsfgichr  
181 dikpqnllld pdtavklcd fgsakqlvrg epnvsyicsr yyrapelifg atdytssidv  
241 wsagcvlael llgqipfpgd sgvdqlveii kvlgtptreq iremnpnyte fkfpqikahp  
301 wtkvfrprtp peaiialcsrl leytparlt pleacahsff delrdpnvkl pngrdtpalf  
361 nfttqelssn pplatilipp hariqaaast ptnataasda ntgdrqqttn aasasasnt
```

FIG. 32

Human Glycogen synthase kinase-3 alpha (GSK-3 alpha).

```
1 msgggpsggg pggsgrarts sfaepggggg gggggpggsa sgpggtgggk asvgamgggv
61 gasssgggpg gsgggsgggp gagtsfpppg vklgrdsgkv ttvvatlggg persqevayt
121 dikvigngsf gvvyqarlae trelvaikkv lqdkrfknre lqimrkldhc nivrlryffy
181 ssgekkdely lnlvleyvpe tvyrvarhft kakltipily vkvmyqlfr slayihsggv
241 chrdikpqn1 lvdptavlk lcdfgsakql vrgepnvsyi csryyrapel ifgatdytss
301 idvwsagcvi aeillgqpf pgdsgvdqlv eiikvlgtpt requiremnpn ytefkfpqik
361 ahpwtkvfks rtppeaialc sslleytpss rlspleacah sffdelrc1g tq1pnnr1lp
421 plfnfsagel siqpslnail ipphlrspag tttlt1pssqa 1tetptssdw qst1datpt1t
481 nss
```

FIG. 33

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Mouse Glycogen synthase kinase-3 beta.

```
1 msgprtttsf aesckpvqgp safgsmkvsr dkdgskvttv vatpgqgpdv pgevsytdtk
61 vngnsfgvv yqaklcdsge lvaikkvlqd krknrelqi mrklhcniv rlyffysg
121 ekkdevylnl vldyvpety rvarhysrak qtlpviyvk ymyqlfrsla yihsfgichr
181 dikpqnllld pdtavklcd fgsakqlvrg epnvsyicsr yyrapelifg atdytssidv
241 wsagcvlael llgqpifpgd sgvdqlveii kvlgtpreq iremnpnyte fkfpqikahp
301 wtkvfrprtp peaialcsrl leytparlt pleacahsff delrdpnvk pngrdtpalf
361 nfttqelssn pplatilipp hariqaaasp panataasdt nagdrgqtnn aasasasnt
```

FIG. 34

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Mouse Glycogen synthase kinase-3 alpha (GSK-3 alpha).

```
1 masttamdvl eelssdssek qrsvnildsf vkdmferias easflarqar nstinsreiq
61 tairlllpge lcrrgtgcgk asvwamgggv gasssgvggg sggpgstsfl qpgvklghds
121 rkvtvvtv gdpersqev actdikvign gsfgvvyqew ladtrelvai kkvlqdkrfk
181 yrelqimckl dhcnivrlqy ffyssgekdd dlylnlvley vpetvyxvar hftkakliip
241 iiykvvmyq lfrslayihs qgvchrninl lvdpdtaikl lcdfgsakql vlgttvapel
301 ytssidvxsa gcvlaellls qpifpgdngv dqlveiikvl gtptreqire mnpkytefkf
361 pqikahpwtk vfksrtaprp lhsalacwst hhtqgsphlr lvptaslmnc gvsgpapqrp
421 ptspcstsvl vicpsnhlsm pfssllt
```

FIG. 35

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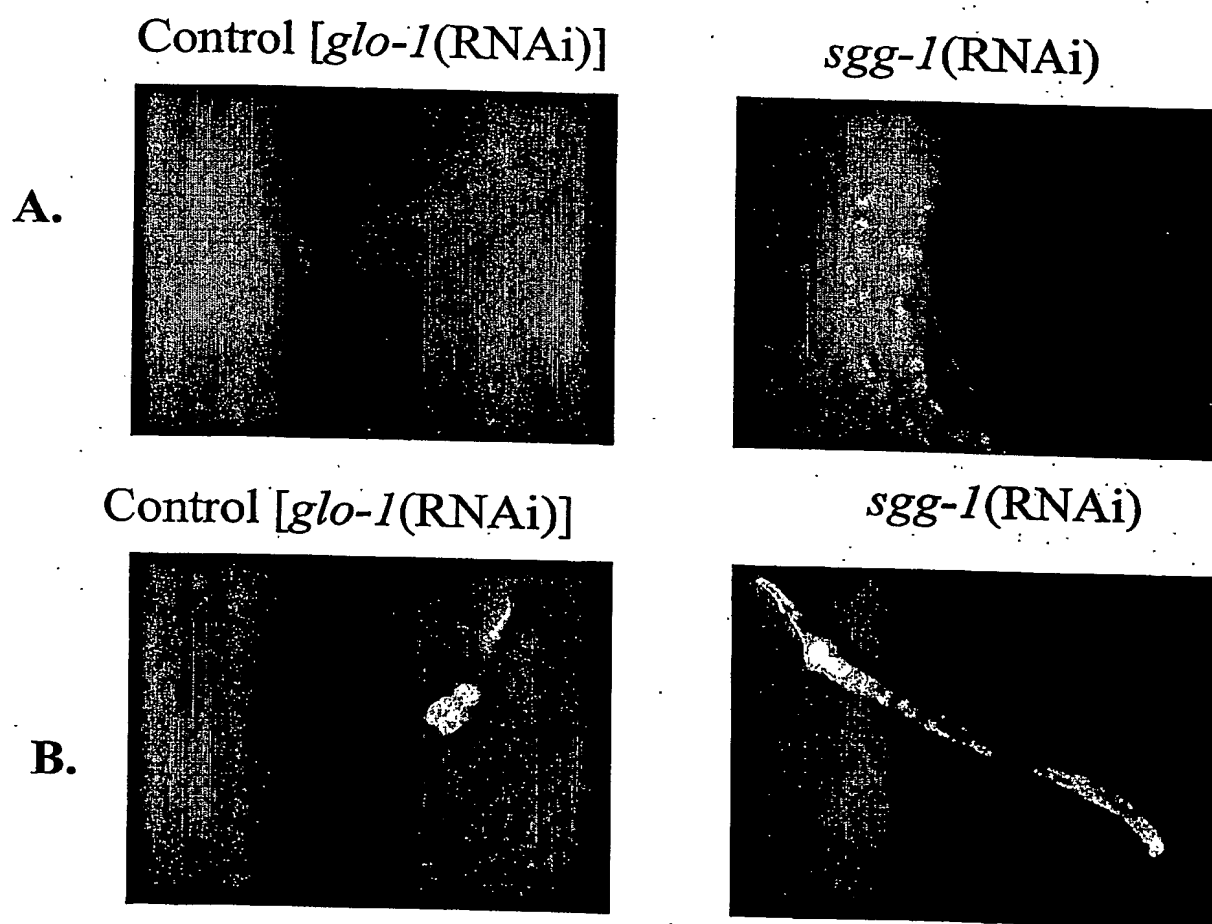
GSK-3 [*Caenorhabditis elegans*].

```
1 mnkqllscsl ksgkqvtmvv asvatdgvdq qveisyydqk vlngsfgvv flaklsttne
61 mvaikkvlqd krkfnrelqi mrklhnpniv klkyffysg ekkdelylnl ileyvpety
121 rvarhyskqr qqipmiyvkl ymyqllrsla yihsigichr dikpqnlid pesgvlklcd
181 fgsakylvrn epnvsyicsr yyrapelifg atnytnsidv wsagtvmael llgqpifpgd
241 sgvdqlveii kvlgtptreq iqsmnpnyke fkfpqikahp wnkvfvrhvp aeaidliski
301 ieyptrsprt pqaacqhaff delrnpdarl psgrplptle mdgpmigtgei sptsgdvagp
361 sa
```

FIG. 36

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***sgg-1* (GSK-3) inhibits constitutive SKN-1 nuclear accumulation and induction of its target gene *gcs-1*.**

**FIG. 37**

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Ala substitution at a predicted GSK-3 phosphorylation site results in nuclear localization of SKN-1

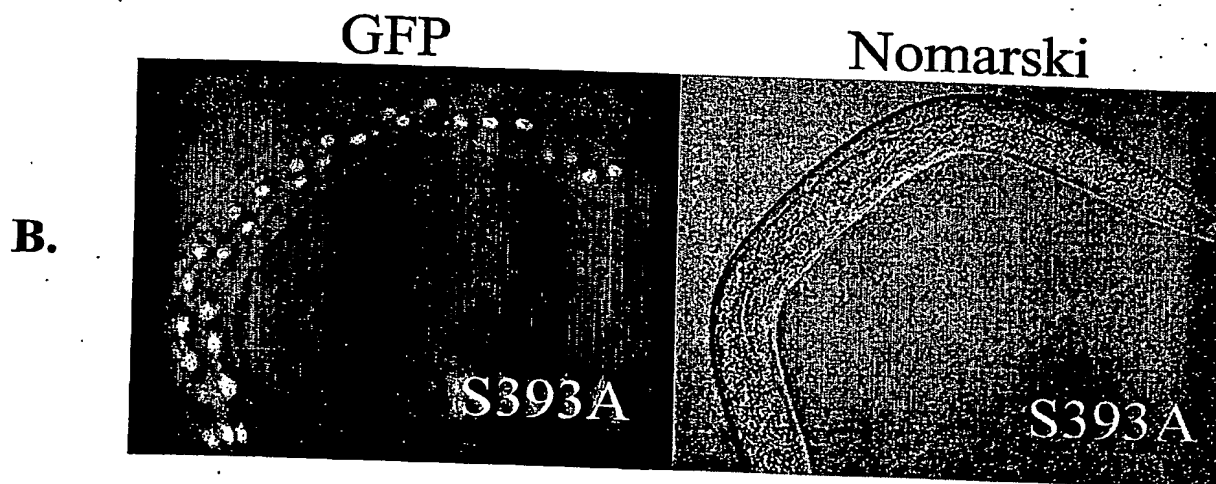
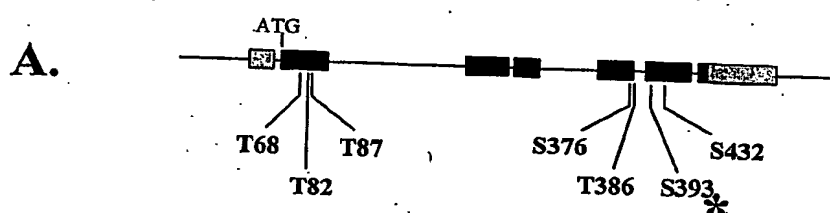
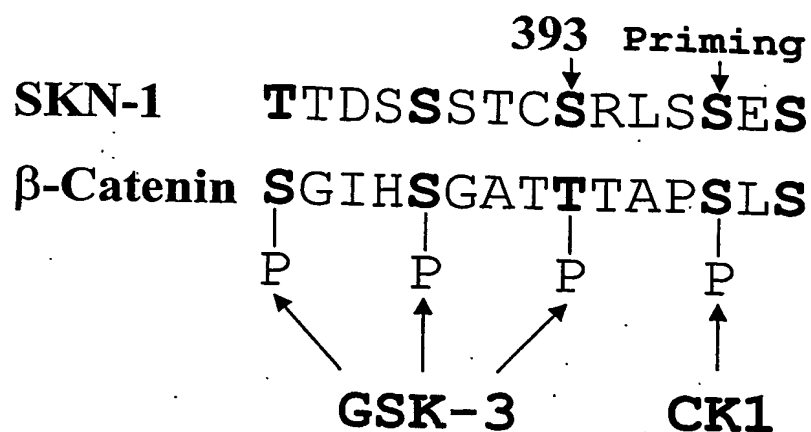


FIG. 38

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A.



Peptides: 1. WT

393 397

↓ ↓

DCTDSSSTCSRLSSESPRYTSE

2. WT+P397

Ⓟ

DCTDSSSTCSRLSSESPRYTSE *

3. S393A+P397

Ⓟ

DCTDSSSTCARLSSESPRYTSE

Assay:

B.

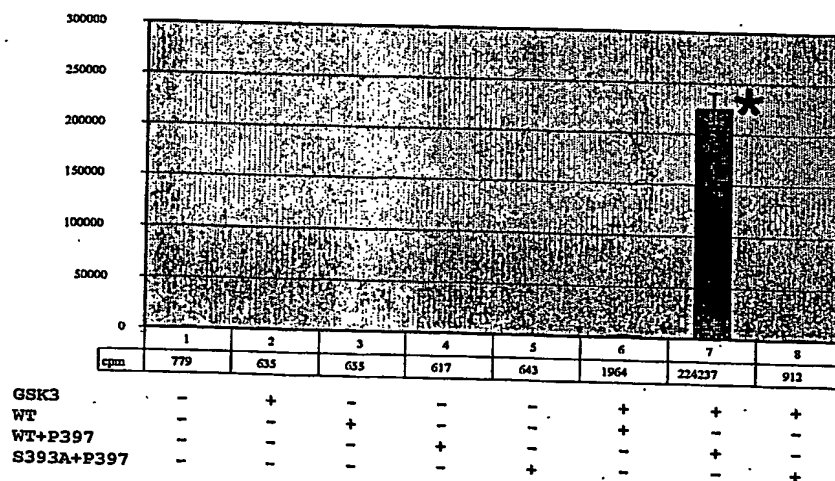


FIG. 39

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